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Tipple, conveyor and headhouse at Kopperston; see p. 71

• **Preparation** to meet every demand of today's exacting markets is the cardinal objective of the new Huber breaker. Modern in architectural design and operating details, this latest addition to Glen Alden Coal's cleaning units combines both simplicity and efficiency and provides for a highly marketable product. R. Dawson Hall tells the story of this 7,000-ton plant in the article on page 68.

• **Conveyor mining** is making real headway in the Henryetta field these days. Atlas Coal has done a particularly outstanding job in this Oklahoma district with two units in rooms averaging 350 tons on double shift in 34- to 36-in. coal. Marked increase in coarse-coal output has followed installation of conveyors and a change in shooting methods. The story will appear next month.

• **"The Lord** helps those that help themselves" might well be the title of S. M. Case's discussion of the industry's problems and what to do about them. This coal man, as the article on page 55 plainly shows, is not one who is looking to Washington for help. His ideas on how coal can improve both its profit and tonnage positions merit close reading.

• **Cost reductions** are in the spotlight wherever coal is mined. At Nemacolin and Dehue, haulage-road timbering expense has been cut 20 to 25 per cent by replacing brickwork and beams with steel roof supports. A. W. Hesse, chief engineer, Buckeye Coal Co., gives the details of how these savings were effected in an article to be published in an early issue.

• **Ten tons** per man-shift is the average at Carbon Fuel's new No. 7 operation in Kanawha County. Coal is loaded by hand but carried from face to the tipple by conveyors. New type underground transformers filled with non-inflammable and cooling liquid are among the other outstanding features of this operation detailed by Jack Edwards in the story beginning on page 51.

• **Modern** truck mines promise to play an increasingly important part in the production and merchandising pictures. One of the latest in this group is Magnolia mine, near Massillon, Ohio. Developed to produce 500 tons per shift, this operation is completely electrified and handles coal from an underground car dump to the tipple by belt conveyor. Magnolia will be described in an early issue.

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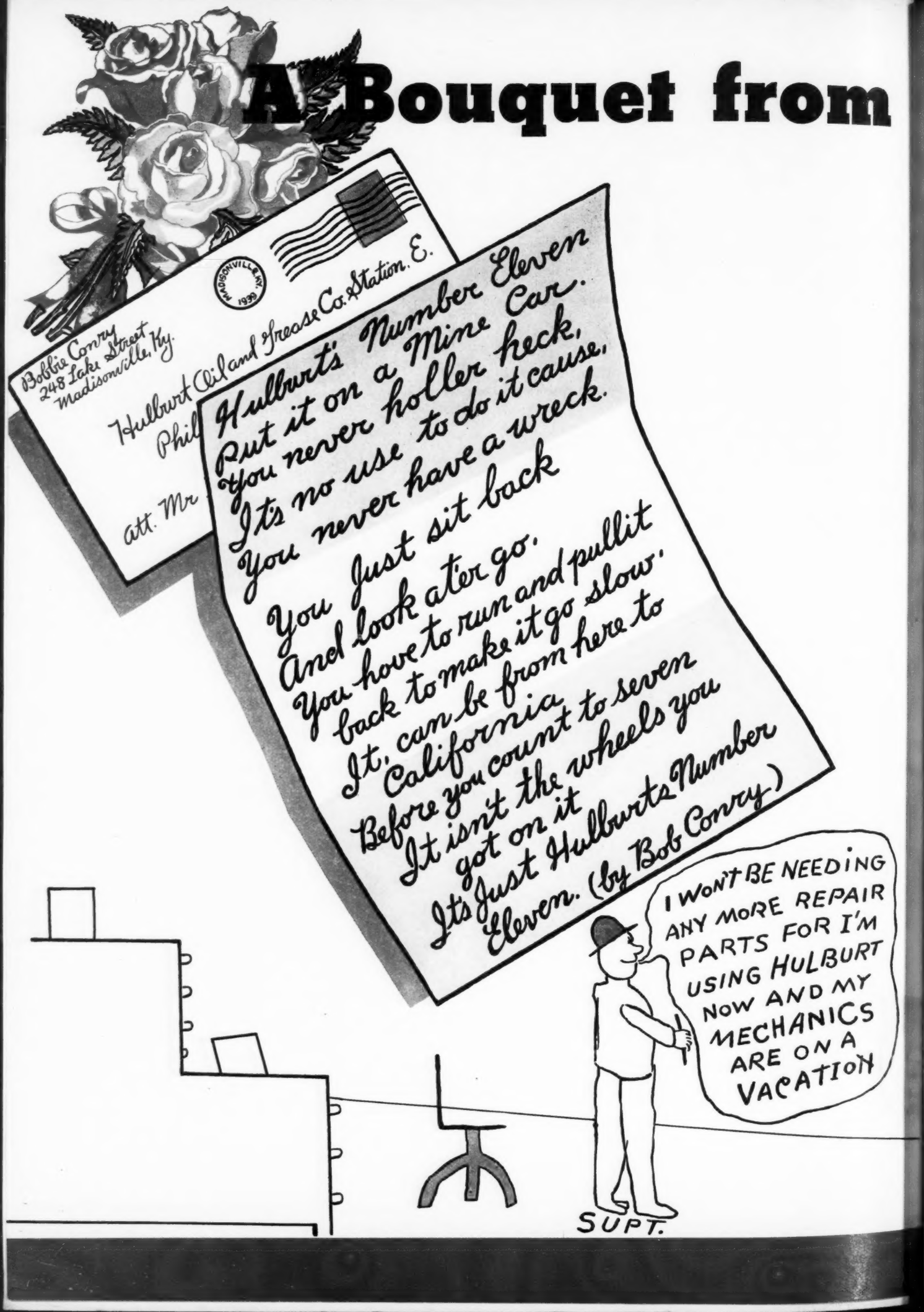
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Madisonville, Ky.
Hulburt Oil and Grease Co. Station. E.
Phil
att. Mr
MADISONVILLE, KY.
1939
Hulburt's Number Eleven
Put it on a Mine Car.
You never holler heck,
It's no use to do it cause,
You never have a wreck.
You Just sit back
And look a'ter go.
You have to run and pullit
back to make it go slow.
It, can be from here to
California
Before you count to seven
It isn't the wheels you
got on it
It's Just Hulburts Number
Eleven. (by Bob Conry)
I WON'T BE NEEDING ANY MORE REPAIR PARTS FOR I'M USING HULBURT NOW AND MY MECHANICS ARE ON A VACATION
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COAL AGE

Established 1911—McGraw-Hill Publishing Company, Inc.

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

SYDNEY A. HALE, *Editor*

April, 1939

Pertinent and Impertinent

• WAGE NEGOTIATORS may at times be shy on economics and public psychology, but they certainly know their poker. The dew was hardly off the Appalachian conference last month before spokesmen for both sides were talking of blue- and white-chip industries. If coal mining, suggested Mr. Lewis, is not in the blue-chip class, the fault rests on management. Not entirely, John; not entirely. But if management and labor will cooperate whole-heartedly and unreservedly to reduce costs so that volume may be increased, coal mining can climb into the select blue-chip group.

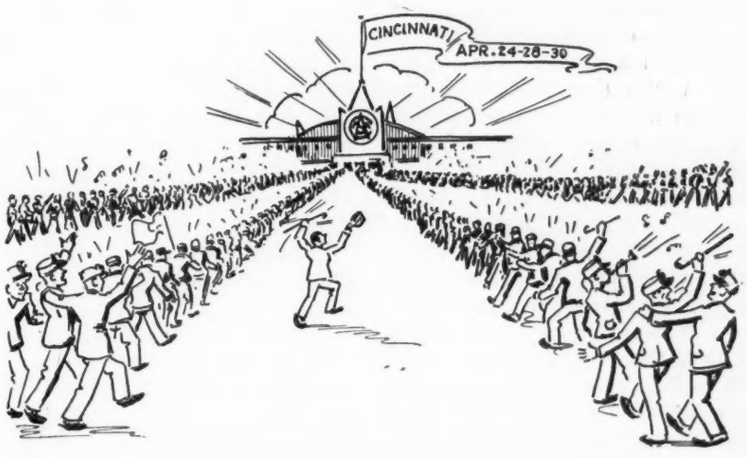
• ANTHRACITE MEN — producers, wholesalers, retail distributors and coal-burning-equipment representatives—sat down to discuss their common problems at Lehigh University a year ago. They found the interchange of opinion so enlightening and helpful that it was immediately decided to make the conference an annual affair. This year the conference is planned to collate the results of researches in combustion and experience in production, preparation and utilization. Lehigh is the host; Bethlehem, Pa., the place, and April 28-29 are the dates. Mark it on your calendars now!

• "COAL COMES BACK," says Babson in a widely publicized statement. Stupid of us, no doubt, but we didn't know it ever had disappeared. Not with more than 99 per cent of the known reserves unmined in the United States and with more than half of the national energy supply currently furnished by coal. Measured in terms of capital investment, value of products and number of workers, mining ranks fourth in the primary industries of the country. Coal employs more than half a million men annually, distributes over $500,000,000 in wages, buys more than $100,000,000 in consumable supplies and pays more than $25,000,000 in taxes. Let's see, Mr. Babson, where *were* we?

• CINCINNATI will again play host to the industry April 24-28, when the American Mining Congress stages its sixteenth annual convention and exposition of coal-mining equipment. Coal men who have attended any of the preceding gatherings should need no special urging to repeat. Those who have not, owe it to themselves and their jobs to discover why thousands of their brethren make this annual pilgrimage. There they will find practical operating men discussing successful innovations which only a short time ago were considered impractical dreams. Executive problems, too, are on the program. And entertainment. We'll be seeing you there.

Pay Dirt

NO DISTRICT has faced keener competition than the Southwest. Rival coal fields invade its nearby markets and block long-distance movement of Southwestern coals into their own consuming areas. Oil and natural gas plague it at home. But do progressive Southwestern coal interests pattern after the canvas-kissing pugilist and meekly take the count? They do not.



Kansas City was the home of one of the earliest cooperative ventures in combustion engineering service for the coal trade. Leading Southwestern producers and distributors have been prompt to recognize the possibilities of the small stoker in holding the domestic market. A few weeks ago fresh ground was broken when they united with the Kansas City Power & Light Co. and leading stoker manufacturers in a joint campaign promoting stoker equipment. For the first time, a major public utility offers stokers on time payments as part of its power-merchandising campaign. Once again the Southwest strikes pay dirt because it believes fighting more profitable than crying.

Decreasing Employment

WITH MILLIONS IDLE, no honest proposal for increasing industrial employment should be lightly dismissed. Many labor leaders and social students contend that the direct way of achieving this desirable end is a further shortening of the workday and work-week. If each man now employed works fewer hours, runs this argument, obviously more men must be added to industry's payroll to meet existing consumption demands. That was the basis upon which the United Mine Workers renewed its plea for the 30-hour week at the Appalachian wage conference last month.

Unfortunately, in the coal industry at least, the problem is not quite as simple as this thesis of organized labor. And coupling the proposal for a reduction in hours with a demand for higher daily wages does not make the problem easier. In normal economic processes, shorter hours and increased pay have been made possible through increased productivity and lower costs. Promise of increased productivity, however, is absent, and necessarily so, from the union presentation. Were the union to contend that shorter hours would not lower present average production per man-shift, its claim that the change would increase mine employment would be destroyed.

The fundamental fallacy in the proposal is one held by many labor spokesmen and some employers. It is the mistaken belief that the consumer must buy certain commodities regardless of the price tag. That may be true with respect to a few essential products for which there are no substitutes. It certainly is not true with respect to fuels. High prices during the World War and the early '20s stimulated increased efficiency in fuel utilization and so acted to slow down the growth in consumption. High prices also have been a factor in shifts from coal to oil and gas.

While shorter hours with higher costs for coal might result in an immediate increase in the number of mine workers employed, such an increase would be only temporary. As consumer resentment became articulate, coal demand would further shrink and mine employment would grow smaller, not greater. What the industry—management and men—needs is higher productivity and lower costs. Only in this way can volume tonnage be secured; only in this way is there solid hope for increasing employment and maintaining adequate wage standards.

Mine Bacteria

STAGNANT POOLS in the mines frequently develop hydric sulphide. According to general belief, this is due to the action of an anaerobic bacterium which converts sulphates to sulphides. Hydric sulphate becomes the volatile hydric sulphide, and ferric and ferrous sulphate are converted to pyrite, which, thought probably of microscopic dimensions, will sink to the bottom of the sump. Thus, impounded waters may be temporarily deacidified.

Moistened crevices of solid coal may be dusted with microscopic pyrite by the same bacteria. Other sulphur bacteria that have reverse actions, however, also must be considered, especially in crevices, for these microorganisms are in a degree aerobic. Such phenomena need study as to their possible effect on the acidification of mine waters and on spontaneous combustion. When spread in coal in an inert atmosphere, pyrite may oxidize rapidly on exposure and cause heating, and, when lifted from the bottom in pumping and oxidized, it may make extremely acid water.

Reprint—Not by Request

WHETHER the mechanization commission set up under the present Appalachian wage agreement contributes to a better understanding of a question upon which there has been much loose thinking depends largely upon the frankness with which the study is approached. Admittedly the problem is not a simple one. Its ultimate solution demands careful weighing of involved social and economic factors as well as inter-industry competitive situations, a fine balancing of abstract equities with palpable necessities.

Emphasis is placed on frankness, however, for two reasons. The machine, first hailed as the liberator of labor from drudgery, is now held up by certain groups who have wrapped themselves in the robes of acute social consciousness as the author of most, if not all, of our industrial ills of the past few years. Too many industrialists—and coal is not without its quota—meet the issue thus raised with silence; "let sleeping dogs lie" is their motto.

This may be a delightful theory, but it ignores the rather important fact that these metaphorical canines already have been aroused from their slumbers and now frighten the timid with their baying. All silence and concealment on the part of those who believe in mechanization can do is to make the baying more horrendous. Such a policy means an open field for propagandists more concerned with embellishing a story than with making an impartial study and appraisal of the facts.—*Originally published under the title "No Pussyfooting," in the August, 1937, issue of Coal Age.*

KATHLEEN SUPPLY SYSTEM

+ Permits Close Daily Check on Use And Accurate Allocation of Cost

By JOHN H. COOK, JR.
General Storekeeper
Union Colliery Co.

and IVAN A. GIVEN
Associate Editor, Coal Age

COMPLETELY mechanized as a result of work started in 1924, and now producing an average of 5,310 tons per day (last quarter of 1938), the Kathleen mine of the Union Colliery Co., Dowell, Ill., is served by a storekeeping system enabling the management to determine with maximum accuracy the cost of all materials and supplies issued for operating purposes, for the extension of facilities and for the upkeep of equipment, structures, electrical distribution systems and other items of plant and equipment. As figures on materials and supplies issued are available daily, this naturally permits immediate initiation of the proper steps to prevent loss or waste of such materials and supplies, or excessive use growing out of abuse or neglect of equipment, as soon as they become evident through greater-than-normal requisitions.

The Kathleen storekeeping system, through the medium of a perpetual inventory, also is designed to show month by month the exact quantity and cost of all materials and supplies received or returned each month, issued each month and on hand at the end of each month by individual items. Cost in all cases includes the pro-rata portion of the transportation charges or other expense incidental to placing the items in stock so that they are available for use.

A simple supply-requisition form for the use of the men at the mine, a record book and a file of inventory cards—one card for each individual item in stock—are essentially all the direct records that are necessary to maintain this perpetual inventory and also supply the daily data required by the operating management. A "Report of Material Received" shows the quantity of materials and supplies received; the manufacturer's invoice shows the direct cost, and the bill from the carrier shows the transportation charges. From these sources, the total cost of shipments received and also the unit cost may be determined by simple addition and division, after which the details are entered on the appropriate inventory card, a sample of which is shown in Fig. 2.

Items issued each day on "Supply Requisition" forms (Fig. 3) are listed each day under the correct stock-class headings in the monthly book, and each day a summary is made showing, by means of "Operating" and "Maintenance" expense-account numbers, plus supplemental identification numbers in the case of equipment such as loading machines, cutters, drills, locomotives, etc., where the materials issued that day were used. This summary is for the use of the operating management at the mine. At the end of the month, the entries in the monthly book are used in bringing the inventory cards up to date and furthermore for the preparation of a report for the main office showing issuance of supplies by classifications (twelve in number, each bearing an account number), for the value of which the mine receives credit. This report also shows by means of the "Operating" and "Maintenance" account numbers where the supplies were used.

Recovering the No. 6 coal, the Kathleen mine is equipped with a main hoisting shaft fitted with overturning skips and an airshaft also used for hoisting men and materials —and coal in an emergency. Coal is prepared in a steel shaker-screen tipple with a separate Stump "Air-Flow" cleaner installation for the fine sizes. Refuse is disposed of by means of an American Steel &

Fig. 1—Form for recording the receipt of materials and supplies at the mine.

Form C28

REPORT OF MATERIAL RECEIVED

UNION COLLIERY COMPANY _____ 19____

Following material received this day in good condition except as noted and added to Stores as shown below:

QUANTITY	DESCRIPTION OF MATERIAL

FROM

Name

Address

Frt. Exp.

P. P. Way

R. R.

Waybill or Pro. No.

Car No. and Initial

Weight Charges

Trans. Chgs. to Acct. No.

No. of Pkgs.

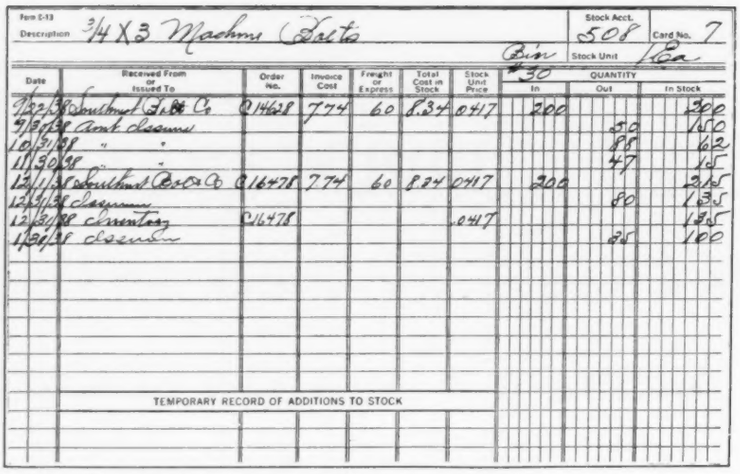
CHARGE ACCOUNT NUMBER

Applied on Order No.

PARTIAL—COMPLETE

NOTE—Report only one delivery on this sheet.

Received by _____ Storekeeper



Form C-13
Description 3/4 X 3 Machine Bolts
Stock Acct. 508
Card No. 7
Bin F30
Stock Unit 1 Ea

Date	Received From or Issued To	Order No.	Invoice Cost	Freight or Express	Total Cost in Stock	Stock Unit Price	QUANTITY In	QUANTITY Out	QUANTITY In Stock
7/22/38	Southwest Bolt Co	C14628	7.74	60	8.34	.0417	200		300
9/8/38	Amt cleanup							50	150
10/3/38	"							88	62
11/30/38	"							47	15
12/1/38	Southwest Bolt Co	C16478	7.74	60	8.34	.0417	200		215
12/3/38	cleanup							80	135
12/31/38	Inventory	C16478				.0417			135
1/30/39	cleanup							35	100

TEMPORARY RECORD OF ADDITIONS TO STOCK

Fig. 2—Sample inventory card used at Kathleen, showing method of recording receipts and disbursements of materials.

Wire Co., aerial tramway, with the exception of mine rock brought out at the airshaft, which is handled by a 5-ton Goodman locomotive. A 25-ton narrow-gage electric locomotive is used for shifting empty and loaded railroad cars. Aside from d.c. conversion equipment, other major surface equipment and structures includes an office building, shops, hoist houses (all hoisting is done electrically), wash house and lamp house and a Jeffrey centrifugal fan equipped with an electric motor and a standby steam engine. This fan, however, now is kept in readiness only for use in emergency, as the mine requirements normally are supplied by two 6-ft. Aerodyne units installed underground.

Cutting, shearing and drilling are done by 22 Goodman standard shortwalls; three Joy, three Sullivan and three Goodman shearing machines; and 22 "Little Giant" single- and double-post drills. The coal is loaded by six Goodman power shovels and eleven Joy 5BU loading machines, four of which are double-shifted. Two spare Joys and one spare Goodman shovel are kept on hand. Transportation involves the use of 600 mine cars (mostly wood construction—all equipped with Timken-bearing wheels), nineteen 6-ton and five 8-ton Goodman cable-reel locomotives, and two Westinghouse and three Goodman 15-ton trolley locomotives. Dewatering is handled by seven gathering pumps and three triplex-type plunger pumps, the latter forcing the water to the surface.

Both a.c. and d.c. power is used for the operation of underground equipment. D.c. conversion equipment underground consists of three stationary and three portable rotary sets. Two additional rotary sets are

For a.c. service, fourteen transformer stations (usually three 25-kva. transformers per station, with some made up of 50-kva. units) are located underground. Transformer stations and portable d.c. units are moved as required. Both transformer stations and d.c. units are supplied with 2,300-volt current by non-metallic cables. Other underground equipment includes a rock-dusting machine, portable compressor, tool and supply trucks.

The operating program at Kathleen is set up for the maintenance of an average daily output of 5,000 tons; and to meet the mine requirements for repair parts, wire and cable and other electrical materials, iron and steel, timber and lumber, track materials, lubricants, explosives, pipe and fittings, and all the other material required for a mechanized operation of this size, over 2,000 individual items are kept in stock. All the records necessary in the receipt and issuance of this list of items are kept by two men—a general storekeeper and an assistant. The advent of mechanical loading naturally resulted in an increase in the number of items and the total value of the stock on hand at the mine, as is evidenced by the addition of "Loading-Machine Supplies" to the list of stock-account numbers. Shearing also increased the number of items carried under the account number for "Mining Machines."

Materials and supplies are received and issued under twelve account numbers. In other words, materials and supplies are divided into twelve classes, to each of which is assigned a number for convenience in allocating receipts and disbursements to the proper classes. Main-office records are kept on the basis of these stock numbers, although the monthly reports filed by the mine for credit for the money value of material used also show the ultimate destination of the material by means of "Operating" and "Maintenance" account numbers and thus enable the executive department to check usage when desired by departments, classes of equipment, etc., although not by individual machines, as in the case of the daily report made to the mine management. The twelve stock

C-17

SUPPLY REQUISITION

12/15/38, 19

Storekeeper, deliver to bearer the following material to be used for Jay Loader

STOCK No.	DESCRIPTION	QUANTITY	UNIT COST	AMOUNT	CREDIT ACCT. No.	CHARGE ACCT. No.	DELIVER TO
1313	Beam	28	9.62½	1924	573	494	Jay #7
	Bar Rd	10	6.75	67.50	502	380	Jay 7
	Pipe	2	1.35	2.70	570	370	Jay 7

Signed John Brown

Fig. 3—Form for requisitioning supplies for use at Kathleen mine. This form, plus the inventory card and a "monthly" record book, are the essential items in the system of controlling supply use at this operation.

classes with the account numbers assigned to each are listed in Table I.

For allocating expenditures for labor, supervision, and materials and supplies to the various operations at Kathleen mine, nearly 200 "Operating" and "Maintenance" account numbers are carried in the daily cost statement. In the "Operating" expense statement, supply-account numbers total 45 (Table I). The total of account numbers carried under the heading of "Maintenance" is 48. In each case, in both the operating and maintenance categories, labor cost is charged under a companion account number, with a few additional account numbers for supervision, etc., where supplies are not an element. These operating and maintenance supply accounts permit exact determination, along with machine numbers and other more specific designation of the destination of materials, of just how the money involved was expended. Where the materials and supplies were used for the benefit of only one department, machine, etc., the cost is charged directly. But where the expenditure is for the mine at large, the cost is pro-rated equally to the sections, activities or equipment which share in the benefit. Thus, in the final analysis, all material and supply expenditures (and the same for labor) are finally allocated, either directly or by proration. Each foreman, therefore, knows how his labor and supply costs compare with those of others—an incentive to careful operation of equipment and use of materials, as well as prevention of waste.

The large building at the left houses the surface shop and the parts storeroom at Kathleen. Some of the storage sheds show in the foreground, with another at the left of the shop building.

Table I—How Kathleen Mine Divides Materials and Supplies Into Classes for Receipt and Issue and Also to Determine Points of Use When Issued

Stock Accounts—Receipt and Issue

502—Explosives, detonators and fuse.
503—Timber, ties, lumber, etc.
504—Track materials, except for items in No. 503.
505—Wire, cable and wiring materials.
506—Mining and shearing-machine repair parts.
507—Locomotive repair parts.
508—Bolts, nuts, nails, screws, rivets.
509—Pipe and fittings.
510—Miscellaneous (including drill and pump parts, etc.).
511—Pit-car parts and supplies.
512—Steel and iron.
513—Loading-machine parts.

Operating-Supplies Accounts*

304—Mine-office operation.
306—Mine surveying.
308—Prospecting and drilling.
310—Main-haulage locomotives.
312—Trapping, flagging, switching.
314—Coal hoisting.
316—Coal preparation.
318—Refuse-disposal.
320—Mine examination, rock-dusting, safety work.
322—Brushing, horsebacks, rolls, bottom.
324—Cleaning roads.
326—Cleaning aircourses.
328—Drainage, pumping and pipelaying.
330—Delivering powder underground.
332—Recovery of rails and ties.
334—Recovery of timber.
336—Recovery of wire.
338—Fault work.
340—General bottom operation.
344—Purchased power.
346—Steam power.
348—Storeroom.
350—Shops.
352—Stable operation.
354—Automobiles.
356—Unloading and delivering supplies to mine.
358—Water supply.
360—Lamp supplies.
362—Supplies for watchman.
364—General top operation.
366—Miscellaneous operating.
368—Hand loaders.
370—Loading machines.
372—Cutting machines.
374—Shearing machines.
376—Snubbing.
378—Drills.
380—Loading and shooting.
382—Gathering locomotives.
386—Trackwork.
388—Partings.
390—Timbering.
392—Brattices and stoppings.
394—Doors and overcasts.
396—Electric wiring.

Maintenance-Supplies Accounts*

402—Office building.
404—Shop building.
406—Hoisting—shaft house.
408—Airshaft house.
410—Wash house.
412—Fan house.
414—Powder magazine.
416—Barn.
418—Oil and sand house.
420—Locomotive house.
422—Company residences.
424—Other buildings.
426—Steel tipple and equipment.
428—Concrete tipple and equipment.
430—Main shaft.
432—Airshaft.
434—Main hoist set (skips, guides, ropes, mechanical and electrical equipment).
436—Airshaft hoist set (cage, guides, rope, mechanical and electrical equipment).
438—Fans and drives.
440—Indoor substations (conversion sets, switchboards, meters, cables and transformers).
442—Outdoor substation.
444—Conversion sets, underground substations.
446—Wire lines, cables, transformers, stations underground.
448—Boilers—steam and hot-water.
450—Yard tracks and steam locomotives.
452—Pumps, motors, pipe-lines, drainage equipment.
454—Dump cars and refuse-disposal equipment.
456—Rotary dump and equipment.
458—Mine scales.
460—Track and wagon scales.
462—Mine lamps.
464—Mine telephones and lines.
466—Shop equipment.
468—Wash-house equipment.
470—Mining machines.
472—Shearing machines.
474—Drills.
476—Mine cars.
478—Mine locomotives.
480—Mine tracks.
482—Brattices, stoppings, doors, overcasts.
484—Mine yard and equipment.
486—Water-supply equipment.
488—Automobiles.
490—Stable equipment.
492—Miscellaneous equipment.
494—Loading machines.
496—Blowers.

* In each case, with one or two exceptions, a corresponding labor account is carried, the two classes of accounts making up the "Operating" and "Maintenance" expenses for the mine.

Operation of the Kathleen supply system is based in general on keeping a month's requirements on hand. Requisitions for new supplies generally are made the first of the month as a means of simplifying paper and detail work, but requisitions are placed at any time if it seems that a shortage will develop in certain items. Requisitions on the purchasing department are made up by the general storekeeper and then are approved by the general superintendent. The purchasing department, to which the requisitions are forwarded, sends out the necessary orders, giving them company numbers and sending copies to the mine.

When the material is received, it is counted, weighed or measured to determine quantity and inspected for quality if of a character making such inspection feasible. At this time a "Report of Material" received, a copy of which goes to the main office, is made out, showing date of receipt, quantity, description of material, supplier, transportation charges and the stock-account number to be charged. The material then is in stock and an appropriate entry is made on the inventory card (Fig. 2). When the supplier's invoice is received from the main office, signifying payment, the invoice cost is posted on the card. From the total of invoice cost and transportation charges, total and unit costs of the

material in stock are determined and recorded.

To obtain material from stock, foremen, maintenance men, etc., indicate their wants on a form entitled "Supply Requisition" (Fig. 3). This form is transmitted to the general storekeeper, who fills in the details of stock number, cost (unit and total), the credit account number and the charge account number, and issues the items called for. The credit-account number shows the class of stock from which the material is taken and the charge-account number the destination of the material by department, equipment, structure, etc. This supply requisition also supplies in a separate entry a still more specific identification of how the material is used—if on a machine, the machine number, etc. Supply requisitions are summarized each day and checked by the general superintendent, chief electrician, mine manager and/or other responsible mine official to detect undue calls for material which might indicate misuse of equipment, loss or waste.

Items of materials issued are entered each day in a "monthly" record book under the stock-account numbers. Entries in the monthly book are copies of everything appearing on the "Supply Requisition" form. At the end of the month, a "Stock-Room Issue" form is made out, showing by stock numbers the total issue of all items by quantity, unit price, total value, and operating or maintenance-account number. This summary goes to the main office, which then credits the mine with the total issued. As indicated above, the summary also may be used by the main office for checking the use of supplies by the various equipment groups, departments, activities, etc., corresponding to the account numbers. Entries in the monthly book also are used in bringing the inventory cards up to date. Usually, this is done at the end of the month, although posting can be carried out at any time. Naturally, on this basis, an inventory card shows at least by monthly periods, if not constantly, just what the receipts and issues of this particular item were and how many units were left on hand at the time of posting. Twice a year, the perpetual inventory, as shown by the cards, is checked by a physical inventory. The difference, as a rule, is very small.

The Kathleen parts storeroom, part of which is shown here, contains approximately 1,800 bins and is divided into sections by stock-account numbers to facilitate finding materials. The steel file in which the general storekeeper is looking contains the perpetual inventory cards.

Part of the Kathleen timber-storage yard, which gives some idea of the requirements of this operation. At the right is part of the oil and grease dock.

Materials Storage

Facilities for storing materials and supplies at Kathleen include a parts storeroom approxmiately 50x100 ft. and containing around 1,800 bins, with a small annex for certain bulky or long materials, such as hose, shovels, etc.; an iron and steel shed; spike shed; shed for miscellaneous materials; timber yards; oil and grease dock for storage of lubricants in drums; sand-storage bin; and a lumber shed. A special unloading platform is provided for heavy materials and machinery. All bins in the parts storeroom bear numbers and the storeroom is divided into sections in accordance with stock-account numbers to facilitate finding items. Bin numbers are carried on the inventory cards to further facilitate storing and issuing supplies.

Kathleen is provided with a loading-machine shop back in the mine and an electrical and mechanical shop on the bottom. Small stocks of supplies, usually not over $300 in value, are kept in these shops. Mechanics on each section also are provided with small stocks of frequently used parts which can be installed without bringing the machines out to the shop. Usually, the section stocks, kept in locked cabinets, do not include more than 40 items. In all cases, however, the major requiremnts are requisitioned each day for immediate use in specified locations or on specified equipment, and in case a maintenance man or mechanic uses an item from the underground stock he must requisition a replacement immediately, giving on the requisition the machine number on which the used part was installed so that it may be charged correctly.

HOW WILL BUYERS REACT

+ To New Coal-Price Patterns

Set Up by Bituminous Commission?

By G. B. GOULD
President, Fuel Engineering Co.

• Operators, the National Bituminous Coal Commission and the courts may set up or upset minimum prices on soft coal, but the buyer will still have the last word. His are the reactions which will determine the success or failure of any price schedules —producer-conceived or government-ordained. What do the price-fixing plans now in ferment in Washington mean to him? How will they affect his buying habits and preferences? What coals should lose, which gain under the new price patterns? G. B. Gould, who has acted as technical adviser for industrial consumers in the purchase of hundreds of millions of tons of coal, discusses these and related questions in this article.

BARRING some successful legal attack, the time approaches when the industrial coal consumer must readjust his coal buying to another attempt to control coal prices. Previous attempts were not in effect long enough for many consumers to have a chance to find out from experience just how the price pattern really affected coal selection. Many of them had accumulated large enough reserves in anticipation of higher prices so that they bought little or no coal under the fixed prices.

A higher *level* of prices is not the only, nor even the most, important result, from the standpoint of the individual consumer. Generally the prices to be established under the Guffey act for the kinds of coal used in industrial plants will be higher than the year-round average price for those coals at any time within the past ten years or more. There are individual exceptions to this, of course, among some of the highest price classifications.

Adventuring in Strange Land

If the price schedules are again put into effect, and maintained for any length of time, industrial consumers will come more and more to realize that a totally unfamiliar price *pattern*—unlike anything that has previously existed under conditions of free competition—has been established. Each plant will have its own peculiar relation to this new relationship of prices among available coals, according to its own equipment, operating conditions and location. But there are certain general economic effects which will, in one way or another, affect all consumers.

By the "price pattern" is meant the relation of prices among individual coals differing in quality, among whole groups of coals in different districts and among the several sizes of coal from each mine. With some 6,000 mines, and with a minimum of five sizes for each mine (often many more), there are at least 30,000 individual commercial products to which prices must be assigned. It is the relationship among all these prices that constitutes the price pattern.

All of the attempts at price control for bituminous coal from the NRA days down to the present have aimed at something more than just a stabilization of prices. There has been also an admitted purpose to *reform* the price pattern according to certain preconceived ideas of what constitutes a proper relationship among the prices for coals of differing chemical and physical properties. Whether or not these ideas are economically sound, and workable in practice, is a matter of opinion. None of the attempts so far made has lasted long enough to answer that question. It is not necessary to speculate on the point here. Presumably time and experience will answer it eventually.

The basis for the reform of the price pattern is found in two related ideas. One is that the small sizes of coal have sold at prices too far below the prices for the larger sizes; that is, there should be less of a spread in price among the several sizes produced from a given mine. The other is that those coals which have certain properties or combinations of properties which make them difficult to market except to plants which have been deliberately designed and recently built to use them, or to the small number of other plants favored by a minimum of limitations in their coal selection, have sold at prices too low in relation to the prices for competing coals that are acceptable to a wide range of consumers.

> *These two ideas combined lead to a compression of the whole price pattern within much smaller limits than have heretofore existed. The coal buyer who wants to keep his fuel costs at the lowest practicable point will have to change his ideas and his methods of coal selection to conform.*

Many of the steam plants which have been built during the last ten years have had as part of the justification for the investment the economy which was expected to come from the ability to buy and use those types of coal which were less widely in demand and sold at substantially

lower relative prices. The compression of the price pattern within narrow limits destroys in large part, or entirely, this economic advantage which these consumers expected to gain from their investment. And in the same way the inducement that previously existed to modernize a plant is, to this extent, reduced. Of course, there are other reasons for steam-plant modernization—increased efficiency, lower labor and maintenance costs, and increased capacity—but the further economic gain, which has often been a substantial one, resulting from the ability to use the lower priced coals will be largely eliminated. The financial inducement to modernize is, to that extent, reduced.

Effect of Relative Quality

Equally important is the effect upon coal selection for existing plants. For one thing, the compression of the price pattern puts much greater emphasis on the relative quality of competing coals. To illustrate, if two coals differing slightly in quality, but both acceptable for use in a given plant, are priced 20c. apart, the chances are the cheaper coal will be taken, without the necessity of any very careful appraisal of relative values. But if those same two coals are now priced alike, or perhaps only 10c. apart, the choice might readily go to the higher priced coal, but obviously now the accurate determination of the relative value of these two coals in *use* becomes a matter of greater importance. This is, of course, an oversimplified example, for every industrial consumer has a large number of possible choices, but it illustrates how the compression of the price pattern may change the order of preference among several coals for use in a particular plant.

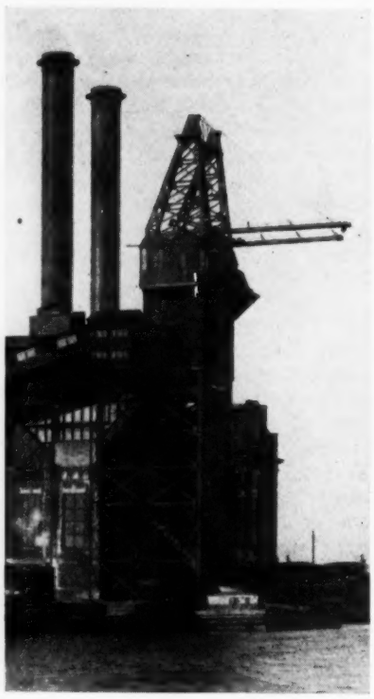
The same kind of effect upon a consumer's choice is brought about by reducing the spread in prices among sizes from each mine. If this spread is wide, it may be worth while to put up with some minor disadvantages of a small size, but if the spread is narrowed too much, the financial inducement disappears, and a larger size becomes preferable.

The combined effect of compressing the price pattern in two directions will undoubtedly cause some plants to shift to a type of coal which, under fixed prices, brings a higher price than the type of coal previously found to be the most economical.

In some districts, the price pattern adopted brings together at one price a larger number of coals than under conditions of unrestricted competition. For example, in one large price-fixing unit, a quarter of the entire output of that district is in one price class. Under such circumstances it becomes increasingly important to discriminate accurately among these coals as to their quality and value for the particular plant. All coals placed in the same price class are not there because they are all identical in quality or possessed of the same combination of chemical and physical properties. They come together at the same price because, though differing in their qualities and in their adaptibility for any individual plant, they are thought to be equal in marketability *in general.*

The first effect of controlled prices will be a gradual change in attitude among coal buyers and in the methods necessary to make their coal buying decisions as they come to realize the true significance of the changed conditions. There will be, too, many changes in coal-buying preferences, but the net effect of all these changes among thousands of consumers, resulting from such a fundamental change in the price pattern, is quite unpredictable and can be determined only by experience over a period of time.

Because of this, the first effect on coal buying is neither the whole effect nor the final one. The price-control plan establishes only *minimum* prices, except that the Commission may also establish maximum prices when unusual conditions make that desirable. Under normal conditions, the intention is to fix only the minimum prices. At the beginning, assuming no serious interruption to coal production occurs, the minimum prices will be the actual market prices in nearly all cases.



But the price relationships thus established do not represent price differences which have resulted from the free play of composite consumer preference but, instead, a relationship among prices for competing products which the several committees and the Commission think should exist.

Therefore, if the net effect of changes in consumer preference at the established differentials should be a market shift toward one mine or group of mines, or toward one size, those particular coals may be in such demand that they will rise in price, independent of other prices, thus establishing a new relationship. Some coals and some sizes may also, at times, be difficult to buy.

Consumer Preferences

Take, for example, any one of the large groups of coals included in the same price class. Consumers are sure to become increasingly discriminating among these coals, with a steady drift of preference toward the best of them. The others, though perhaps only slightly less favored, are defenseless and incapable of offsetting the preference for the other coals by making any price concession. Such a situation only indirectly affects the consumer at first. It is primarily a problem for the producers and the Coal Commission, and one which no doubt will be dealt with when and if it happens. But it is the possibility, in fact the probability, of changes of this kind in the market, along with the direct and immediate effects on individual consumers, which will introduce into industrial coal buying many new and unfamiliar problems for months and possibly years to come, if the present price-control experiment continues in force.

Some of these shifts in consumer preference and dislocations of accustomed distribution channels began to appear in the later days of the NRA experiment. It took about a year before the effects became definitely noticeable, but the price pattern under NRA was not compressed within as narrow a price range as that which will be established under the second attempt at price control under the Guffey act.

NEW CONVEYOR MINE

+ Of Carbon Fuel on Cabin Creek

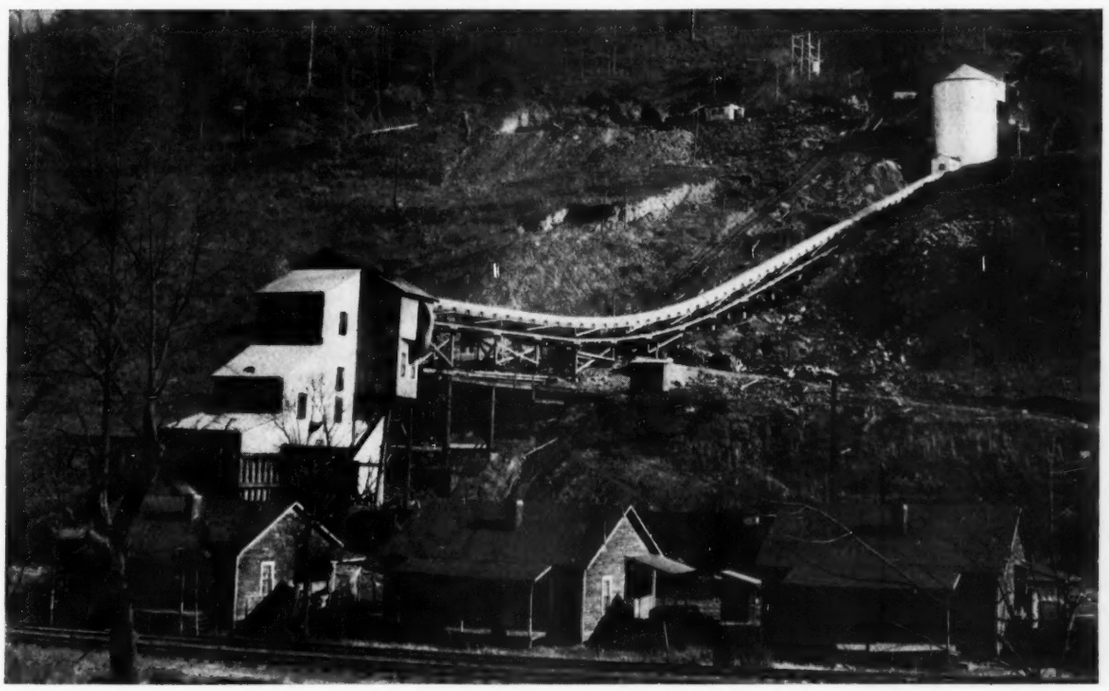
Ships 10 Tons Cleaned Coal per Man-Shift

By J. H. EDWARDS
Associate Editor, Coal Age

CONVEYOR haulage from face to tipple by chain-flight and belt enables Carbon Fuel Co.'s new No. 7 operation at Carbon, W. Va., to mine, prepare and place in the railroad car 10 tons per man-shift, although the coal is hand-loaded and average seam thickness is but 34 in. Except for a battery locomotive for hauling men and supplies, all inside machines are powered by 220 volt alternating current. To advance the power supply as the mine is being developed a 4,000-volt cable carrying 5,000 volts is extended by unwinding from a "live" reel situated at the portal. Underground transformers filled with non-flammable insulating and cooling liquid are used. The tipple equipment, designed to prepare 200 tons per hour for byproduct, gas and stoker markets, includes an air-flow unit for cleaning the ½x0-in. fraction.

New No. 7 is one of six active mines of the Carbon Fuel Co.—all on the Cabin Creek branch of the Chesapeake & Ohio Ry. in Kanawha County. The new opening is in an upper split of the soft and friable Powellton seam, long noted as a by-product coal. As mined and shipped from No. 7, ash content is 3 per cent or less and sulphur content 0.80 per cent or less. The tipple is in the same location as one that served to work out old No. 7 mine in the Dorothy seam 550 ft. above the Powellton. The 34-in. split now being mined (maximum, 36 in.; minimum, 32 in.) lies practically level, is topped with 3 ft. of strong slate that is overlain with sandstone and has a "false" bottom of slate and high sulphur coal, neither of which

A belt conveyor, maximum pitch 24 deg., delivers from a 300-ton storage tank to the tipple and cleaning plant



Left—Looking outby at the main belt from the "duck's-nest" at First Right. Right—In the "duck's-nest" at First Right where the chain-flight mother conveyor discharges onto the belt.

is disturbed. The slate is 1 in. thick and the coal below it is 3 to 6 in. thick.

In designing the plant, full advantage was taken of the fact that the markets require no coal above 1⅛-in. Shooting the coal hard facilitates the hand-loading onto conveyors; then dropping it from the main-heading conveyor onto grizzly bars, arranged in double-stairway fashion at the top of a 300-ton storage tank at the mine portal, completes the breaking so that a 24-deg. pitch is practicable for a 230-ft. (center to center) belt conveyor which carries the coal down the hillside from tank to tipple. Arriving at the tipple, the mine product contains so few lumps that a mine-run crusher is not necessary.

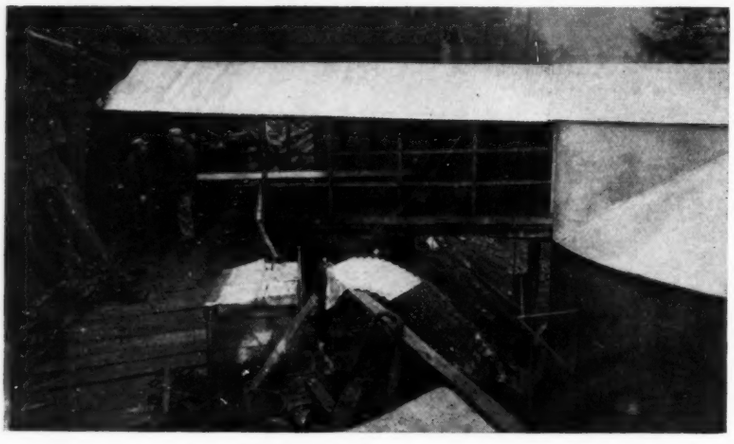
A Gyrex vibrating screen separates the mine-run into ½x0-in., 1⅛x½-in. and plus-1⅛-in. The latter is hand-picked on a belt picking table and then goes to a Robins double-roll crusher. A V-slot-type automatic slate picker on the end of the Gyrex screen removes slate from the plus-1⅛-in. size. After being cleaned in a Stump air-flow unit, the ½x0-in. goes to a byproduct or to a gas car. The 1⅛x½-in. is oil-treated for stoker fuel or is diverted to the byproduct chute. The crushed fraction goes to the byproduct or to the gas. In the several sizes mentioned above, "½-in." is but a nominal figure, inasmuch as screen sizes can be changed and ⅜-in. screening has been practiced at the mine. The tipple has two loading tracks and is operated by three men.

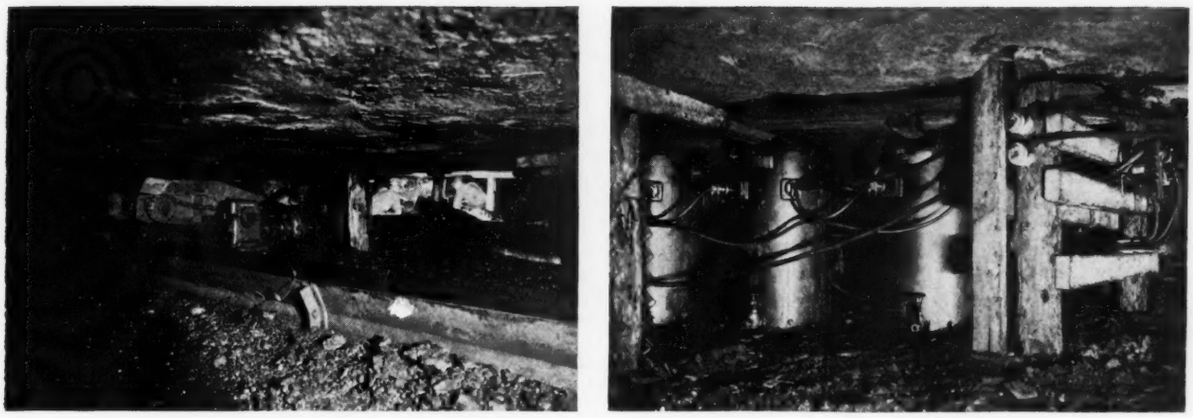
The 300-ton tank (25 ft. in diameter and 38 ft. high) is made of ½-in. curved plates with butt joints arc-welded on the job. A reciprocating feeder driven by a 5-hp. gearmotor delivers to the hillside conveyor, consisting of a 30-in. troughed belt which is protected from the weather by 7-ft. corrugated and galvanized steel sheets bent to a half circle. Idlers and belting were furnished by the Robins Conveying Belt Co. and are interchangeable with those furnished by the same company on the sectional belt conveyor inside the mine. This belt has four plies along the edges and six plies through the center; thus the rubber cover of the carrying side is considerably thicker along the center, where the wear is greatest. The drive is a 10-hp. 220-volt a.c. motor with overspeed device controlling a solenoid brake. Normally this belt conveyor regenerates close to 10 hp. The excessive slope of 24 deg. at the upper end instead of the usual limit of 17 deg. saved a considerable sum in construction of the wooden gallery.

Mining and coal transportation equipment (all items brand new) consists of: five Jeffrey 35B 220-volt a.c. shortwall mining machines with 7½-ft. standard-kerf bars using regular bits which are sharpened by roller forging and hardened by quenching; five Little Giant No. 472 electric coal drills; five Jeffrey blowers with 300-ft. lengths of Ventube; four Jeffrey 30-ft. type HG 5-hp. face conveyors; four Jeffrey 300-ft. type 61AM 10-hp. room conveyors; four Jeffrey 300-ft. type 61WJ 15-hp. cross-heading or mother conveyors, and one Robins 25-hp. main-heading 30-in. belt conveyor. Eight hundred feet of this belt conveyor was in service at the time of this writing and 360 ft. was on hand ready to be installed.

Ultimate length of this first section of the main heading conveyor will be 2,000 ft., after which another similar conveyor will be installed to empty onto the first. A feature of this underground belt conveyor is the use of 4-in. standard troughing idlers and 4-in. return idlers instead of idlers of smaller diameter which usually are incorporated in under-

The mine belt discharges onto breaker bars in the top of the tank. George E. Brooks, general superintendent, and E. H. Tucker, mine foreman, at the portal of the belt heading.





Left—Four face men load two 50-ft. cuts per shift. Right—With transformers using non-inflammable liquid, safety is attained at low installation cost. A wire-mesh fence was removed temporarily to obtain this photograph.

ground sectional-belt-conveyor design. Frame sections of steel are 10 ft. long and are joined by bolts.

Four headings constitute the main entry and two constitute the cross entries. In both cases the headings are driven 20 ft. wide on 50-ft. centers. Room depth is 300 ft., and the centers distance 70 ft. On the advance a 50-ft. room face is mined and on the retreat a 7-ft. slab is taken from the rib, leaving a 13-ft. pillar. Face men are paid at the rate of 56c. per ton and the accomplishment is determined by measurements of face width and advance made at the end of each shift. The rate for conveyor moving is 80c. per hour; in room work, however, the dismantling of conveyor sections up to the drive is included in the tonnage rate of the retreating slab cut.

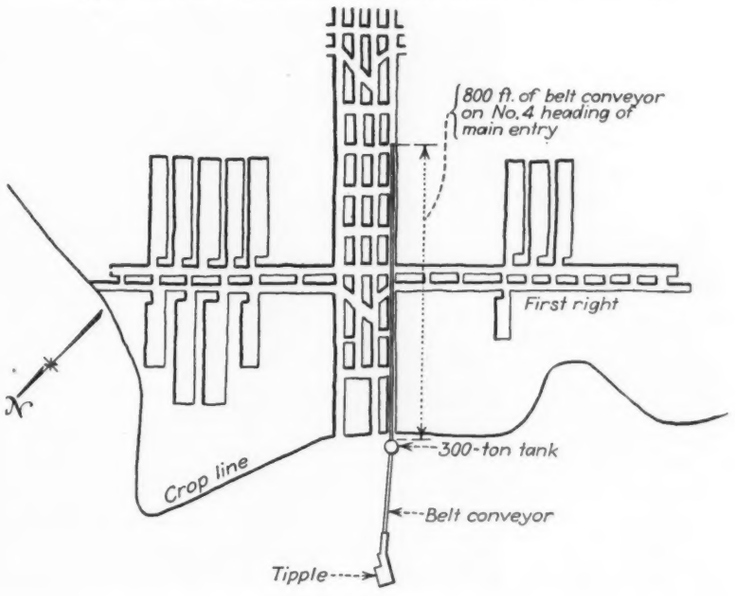
Face crews have been loading 12 to 14 tons per man-shift. The mine is operated six days per week but individuals work only the stipulated five shifts. Four men comprising a room-face crew handle the cutting, drilling, shooting, loading, timbering and routine conveyor servicing and their normal bogey is to load two cuts per shift from the 50-ft. face, thus producing 80 tons. Three men constitute a face crew employed in driving headings.

Posts on 6-ft. centers each way is standard timbering in rooms. In headings the posts are set in three rows spaced 5 ft. and individual posts of a row spaced 4 ft. Shooting is done with duPont Monobel No. 9, 1¼x8-in., 200 sticks per box, loaded three sticks per hole and with the charge positioned close to the top. Three holes per heading and eight holes per room is the regular practice. This "hard" shooting of a comparatively soft coal practically relieves the miner of any digging.

When the mine was visited the development stood as indicated in Fig. 1. Two units were working rooms to the left off First Right, and three units were operating in entries. Besides the 34 face men of the two shifts, 11 other men were employed as follows: two section bosses (one for each shift), three supply men, one electrician, one general utility man, one mine foreman and three tipple men (tipple operates but one shift: coal from second mining shift is stored in the 300-ton tank). Average production of these 45 men is 475 tons per day. After the driving head of a chain flight conveyor has been set up in a room, the mining of the area 50 ft. wide and 300 ft. deep usually is completed in fifteen days' elapsed time, but the record thus far is twenty shifts, or ten working days. To advance a 50-ft. face 250 ft. in ten days is considered a good average accomplishment for a crew.

For operating the inside equipment, 220 volts a.c. is supplied through three 25-kva. General Electric Pyranol transformers, type H, Form KA, rated 2,400-4, 160Y/240-480 volts and connected 4,160-Y on the primary. At present these are installed in a breakthrough 400 ft. from the portal. They set directly on the mine floor but, since they are 38 in. high and the coal at that point was but 32 in. thick, 15 in. of top slate was shot to make headroom for them. A heavy mesh fence tacked to wood posts keeps men away from the high-voltage terminals. If the old type oil-filled transformers had been used, equal safety could not have been attained, even though the

Fig. 1—At No. 7 the coal is transported exclusively by conveyor.



4,000-volt power circulates through that portion of the cable still on the shipping reel. The unreeled portion enters the mine aircourse through the tile in the foreground.

old type units had been installed in cumbersome steel cabinets with oil-tight bottoms.

Power at 4,000 volts feeding the transformers is carried into the mine by a G.E. tellurium and versatol cable of the following specification: 3 conductor, No. 4 a.w.g. stranded, 10/64-in. versatol, heat-resisting, superaging, moisture-resisting rubber with colored copper shielding tapes on each conductor, three ground wires equivalent in cross-section to No. 4 a.w.g., 9/64-in. 60-per cent non-hygroscopic tellurium rubber jacket, 5,000-volt, type RR.

A 1,000-ft. reel of this cable was purchased, and, to save the cost and other disadvantages of splicing, the 400-ft. length extending into the mine to serve the first transformer set-up was not cut from the reel but instead the power is transmitted through the entire 1,000 ft., of which 600 ft. remains on the reel situated outside.

The load on the cable is so small that the heating is not noticeable, even though the cable is coiled on the reel. On the inside the cable lies on the bottom of the aircourse. When the time comes for advancing the transformers 600 ft. farther into the mine, the cable can be extended by disconnecting the reel end from the 4,000-volt feed panel, unreeling, dragging the cable farther into the mine, and reconnecting at the panel.

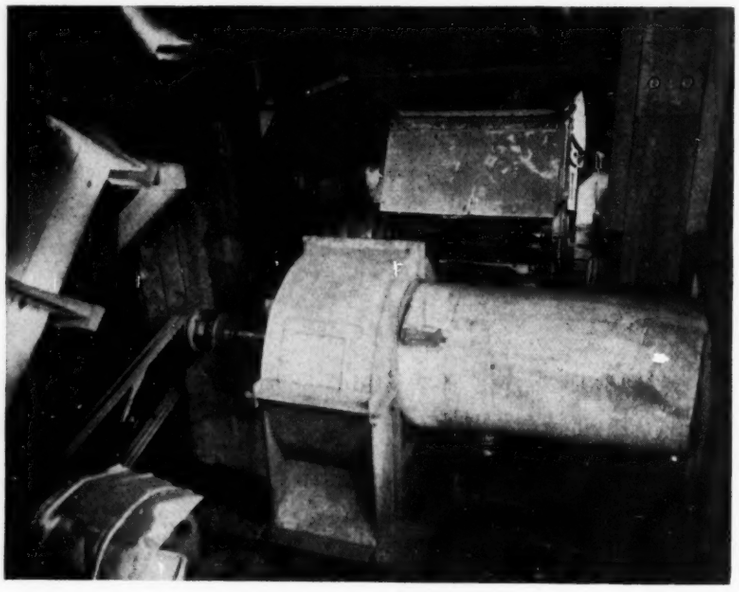
To carry timber, supplies, equipment and men into the mine a 44-in.-gage track is laid on the main in the heading next to that where the belt conveyor is installed. The track is carried into the cross entries also. To enter First Right the track crosses the belt conveyor on a bridge above which sufficient top was shot to obtain clearance. Motive power for this hauling consists of a battery car and a 250-volt locomotive hitched permanently together.

This locomotive, which is but 25 in. high, is a G.E. single-motor worm-gear unit built some years ago for experimental use in the Carbon Fuel mines. The battery, purchased to adapt the locomotive to use in the trolleyless No. 7 mine, is an Exide-Ironclad (118 Type WA cells of seventeen plates each) Hycap. The battery truck, built by the coal company, has a 44½-in. wheelbase, 14-in. wheels and is 23 in. high, 12½ ft. long and 4 ft. wide. Materials and men are carried on two flat cars having 8-in. wheels.

A motor-generator set installed outside near the mine portal serves regularly to charge the battery and also is a source of direct current for arc-welding. Mine ventilation at the rate of 20,400 c.f.m. is supplied by a new 7-ft. Hartzell propeller fan operated temporarily with four of the original six blades removed. As more pressure and/or more volume becomes necessary, the next step will be to use three blades, then four blades, and finally the entire six.

The Carbon Fuel Co. was organized in 1905 and operates in a fee tract of 11,000 acres. This company pioneered mechanization in the Kanawha field when in 1930 it invested over $500,000 in preparation equipment, mobile loaders and auxiliary equipment to mechanize loading and cleaning completely at its No. 9 mine, which has a working height of 10 ft. and continues to produce on the full-mechanical basis (*Coal Age*, March, 1931, p. 119, and May, 1935, p. 191). C. A. Cabell, of Charleston, has been president of the company since 1924. G. K. Cabell is general manager; George E. Brooks, general superintendent; E. H. Tucker is foreman of the new No. 7 mine; T. W. Maguire heads the engineering department; and Carl Scholz, of Charleston, is consulting engineer for the company.

The ½x0-in. from a primary separation is cleaned in an air-flow unit.



COAL STABILIZATION

+ Must Come From Within Industry, Not Through External Regulation

Early this year Coal Age asked a number of mining-company executives what they considered the biggest problem facing the industry in 1939 and what should be done about it. Their replies to the query were published in the February issue, pp. 29-36. The article which follows is an outgrowth of that symposium. Brass hats afraid of direct shots better pass this one by; executives who can take it won't want to skip a single word.—The Editors.

By S. M. CASE
Secretary, Sinclair Coal Co.

READING the telegraphic responses in the February symposium, I am impressed by the similarity of the replies, which seem to be dominated by the excuse that the coal industry is suffering by reason of competitive fuels, taxes and high wages. There is very little criticism directed toward the industry itself. This leads us to believe that our 1939 problem is not at all different from that which existed in 1920 or will exist in 1945.

The major problem that confronts the coal industry can be expressed in one word—ignorance. Let us elaborate. We are ignorant of economic facts, ignorant of what law and regulation can accomplish, ignorant of the true relationship between capital and labor, and finally, ignorant of what the public wants and desires in fuel efficiency and industrial progress.

Mining machinery has been greatly improved over the years. But there has been very little improvement in the education of the public and the industry in the proper use of our product. The good Lord took thousands of centuries to produce the product which we sell. We, with our "puny" knowledge, do not like to take even a generation to find out what its possibilities are.

Railroads consume about 20 per cent of our production and yet we want to hammer constantly on reduced freight rates. Taxes are being increased daily because of governmental interference within the province of industry and yet we ask more taxes to regulate our so-called "competitive fuels." If we do not want taxes to regulate our industry, why is there any reason for taxation or regulation of our competitive fuels? Isn't it plain that any regulation or any so-called "governmental service" is only increased overhead, which all industries must bear?

S. M. CASE

Author of this article is officially secretary of the Sinclair Coal Co., Kansas City, Mo., and secretary-treasurer of Hume-Sinclair Coal Mining Co. and Huntsville-Sinclair Mining Co., but is better known in the industry as Sinclair credit manager. He joined the Sinclair organization, which sells much of its output in the heart of the southwestern oil and natural-gas marketing areas, in 1919.

We do not use the facilities which we have at hand to tell our story to the public. We could educate our retail dealers. We could educate our own coal miners and we could even educate the industry itself, by showing them moving pictures of the right and the wrong way. We could even teach the public economics, of which they are woefully ignorant, by using pictures.

The sales and marketing policies that have been followed blindly for 25 years should be analyzed and the weak and vacillating kind should be tossed out for more constructive and economic ones. The retail dealer can be taught how to educate his consumer in the proper manner of efficiently using bituminous coal. He can be taught how to retain contact with his customer during the spring and summer, when coal is not being burned, and to sell either services or articles that will make this contact possible during that period.

Both the character and the policies of the retail dealer can be raised for him by the wholesaler who raises his own sales standards and particularly his credit policies. The retail dealer is the industry in the eyes of the consuming public. For 25 years he has been allowed to drift to the use of his own devices with very little assistance from the wholesaler or producer in educating him in the art of merchandising and production.

From personal observation we find that there is a very loose credit policy existing within the major producing fields in the East. Our own credit policy was revised twenty years ago and, as a result, we have the finest list of retail dealers that it is possible to have within this particular sales district. This dealer

CREDIT REPORT

Submit With All New Orders or Old Accounts That Have Undergone Change

FIRM NAME.....
Correct legal name—corporation—individual—partnership? Indicate
TRADE NAME..... Old account?.....
If different from legal name
ADDRESS..... STATE.....
FORMER RECORD OF BUSINESS—DETAIL.....
Principal Creditors or References.....
Banks with.....
Banker's opinion.....
Answer the following:
1. Sales per season in car lots.....Population of town.....
2. Class of trade sold.....
3. How many cars can we sell per season?.....
4. Local credit position poor—fair—good—excellent.....
5. *Have you sold this firm on our terms of sale and do they agree to accept them? (EMPHASIZE THIS POINT)*.....
6. Remarks .....
Credit Approved.....
Credit Limited.....
S/O Basis only.....
Dun Report. Coal Credit Bureau.
Salesman
Sinclair Coal Company
Date.....19.....

Fig. 1—Salesmen's credit report; the original is an 8½ x 11-in. sheet.

background enables us to advertise and merchandise through a better medium than if we were to sell all the dealers on price and terms. This is one method by which we have raised the character and standard of our retail dealers. What this policy has meant in keeping our bad-debt losses near the vanishing point is shown in Table I.

Selling the prospective customer the company's credit policy is basic in maintaining such a record. Every Sinclair salesman is urged to sell this policy to the customer before he accepts an order. Each new or doubtful order is given individual attention. Three major sources of information are used in establishing credit ratings and limits: the Kansas City Wholesale Coal Credit Bureau, Dun & Bradstreet and the salesman's report.

Sinclair uses only three very simple forms for its credit records. The first (Fig. 1) is filled out by the salesman and the answer to question 5 on this form is considered of major importance. The second form is a 6x4-in. white record card showing name, rating, credit limits, terms, salesman and credit experience. The third form differs from the second only in color and is used for borderline accounts which, naturally, are watched more closely than the well-rated and well-paying customers.

Can government regulation play a part in improving our industry? We think not. If we have grown any barnacles and permitted them to remain on our industrial body, that is our fault. Our own particular group has had an unusual growth that took place right through the depression. We believe the major reason for this growth is that our management was able to see the facts as they are and not have a wishful thought of any Utopian conditions created by outside help.

Look back over your economic history and inquire if any governmental service installed within the past fifteen or twenty years has increased your living standards except at a higher cost than that which you could pay to gain this service by your own efforts. That is the reason for our opposition to the taxation or regulation of any industry. The power to tax is truly the power to destroy. Destruction is waste, and waste should be fought by each and all of us.

PUBLIC for THE COAL INDUSTRY RELATIONS

No over-night solution to all our problems, of course, is possible. But we overlook one very important way out of our difficulties if proper training is not given to young blood by the industry. Both the public and the industry will reap the reward later of such training.

Character is not only the primary basis of all credit but the very foundation of life. It is necessary, therefore, for us to build character into our industry. In order to build character in our industry each of us within the industry must broaden his viewpoint. Too many of us are inclined to let a selfish viewpoint interfere with our real progress and be detrimental to the industry. In other words, if each of us could adopt this policy to think and act in terms of the benefit to our industry as a whole, we could in turn, receive a larger reward than if we act and think in selfish terms as individuals.

None of us can deny that coal is essential to industrial progress in America. Without coal it would have been impossible to make the gains which have been made; therefore, we, in the industry, should insist on and cultivate the respect to which our product, as well as our industry, is entitled. There has been too much of a tendency to apologize or to act in a beggarly manner in selling our product to the public.

Tonnage and Good Will

One of the fallacies which have been constantly pursued has been our pursuit of volume production without cultivating and constantly rebuilding good will in our markets. Unless we can render a better service to the public, we are not entitled to its good will and its dollars for our product when competitive fuels step in and divert its attention and interest. There is little doubt in our minds that proper research within the industry would easily disclose our major difficulties to us who have created them.

We believe the industry should select its best informed from every department, let them assemble the facts which they can develop, and from these facts build a constructive program that has character and merit. Let us not overlook any economic feature that will serve the industries and the nation. Here is a place to start. The depression has uncovered our faults; it is up to us to cure them. We can do it if we face the facts.

Table I—Gross Sales and Credit Losses, Sinclair Coal Co., 1917–1938

Period	Sales Gross	Amounts of Credit Losses Under Supervision of Sales Dept.	Credit Dept.
1. March, 1917, to Dec. 31, 1922....	$8,034,302.57	$8,700.24	.....
2. Jan., 1923, to Dec. 31, 1927....	9,438,966.83	4,992.00	$1,903.37
3. Jan., 1928, to Dec. 31, 1933....	10,587,637.10	.....	3,094.02
4. Jan., 1934, to Dec. 31, 1938....	11,303,775.55	.....	2,101.15
Total, twenty-two years.....	39,364,682.00	13,692.24	7,098.54

First period represents one of high prices and large margins.
Second period was one of fair prices but smaller margins.
Third and fourth periods are those in which tonnage grew, prices declined and margins declined, but credit losses shrunk and customer good will was more pronounced. Good advertising methods were aided by sound credit policy and this company maintained its volume in the face of other's declining markets.

Ditch Your Cares, Wear a Smile and Come to Cincinnati

An Invitation From the National Chairman

YE COAL OPERATOR of a few years back was a much worried, harassed individual, more or less woebegone in appearance and feelings—costs increasing, sales slipping, markets fading, laborless fuels eating into his outlets, and no adequate weapons for defense.

Ye coal operator of 1939 is a changed man—now fighting mad, right up on the firing line, he is waging a winning fight, with improved mining methods, new sizes of coal, automatic burning equipment and a fearless challenge to all the world. He has not solved all his problems yet, but he is on his way.

This is the type of operator who is going to be present at the Cincinnati Convention of the Coal Division of the American Mining Congress, April 24–28. You cannot keep him away.

The committee on arrangements will be ready for him with a bang-up streamlined menu:

Whole-hearted, sincere welcome
Short, timely papers
Ample discussions
Record-breaking displays
Experts to answer questions
Intimate contact with industry's leaders
Satisfying relaxation.

It is a real pleasure and privilege to extend a cordial invitation to such a profitable, enjoyable four-day session.

"Ditch your cares," wear a smile and meet your fellow operators at this Coal World's Fair in Cincinnati.

National Chairman
Program Committee
American Mining Congress

[THIRD OF THREE ARTICLES ON ROOF-CONTROL PROBLEMS*]

ROOF SUPPORT

+ In Working Places

In Flat and Pitching Seams

By PHILIP B. BUCKY
Associate Professor of Mining
School of Mines
Columbia University

EFFICIENCY at the working face determines the success or failure of a mining operation. While haulageways, shafts and airways are very important in the over-all picture, total tonnage per shift can rise no higher than the combined output of the active working places. Here the greatest number of men is employed; here, too, structural conditions are changing the most and, because of that, here also the greatest number of accidents, especially from falls of rock, occur.

Proper supervision, of course, is the key to fewer accidents. Unfortunately, under the older mining methods the working place or face has been subdivided into such a large number of units (i.e., rooms) that the cost of adequate supervision of both contract and day men has been high. As a result, inadequate supervision, with the losses inherent in such a loose system, too often has been the rule.

How can adequate supervision with its attendant benefits be attained at a cost which will be only a small fraction of the total unit production charges? The start must be made with mine layout and mining methods. Each working place or group of working places should be so proportioned that production will be sufficiently concentrated to reduce drastically over-all unit costs by modern extractive methods. In other words, where room-and-pillar methods are employed, the rooms should be driven as wide as possible; in advancing and retreating longwall systems, the faces should be as long as possible.

Ideal cost standards and objectives cannot be set up without a proper appraisal of mechanization in all its aspects. The relatively low cost and ease of distribution of electric power give this form of energy outstanding advantages in underground mining. Measured in foot-pounds of work output, a man can exert continuously the equivalent of only $\frac{1}{8}$ hp. per hour. In other words, in his seven-hour day he can do $\frac{7}{8}$ hp.-hr. of work. For this he receives approximately $5, as against a cost of 1c. or less for running a $\frac{1}{8}$-hp. motor for seven hours.

Not the Whole Story

These simple comparative costs, however, do not tell the whole story. Installation of machinery and transmission equipment entails large capital expenditures. Such expenditures call for annual amortization charges which must be taken into account in arriving at the actual cost for mechanized operations. A mine with $1,000,000 worth of equipment and a ten-year life expectancy must face an annual amortization charge of $100,000. This charge, it must be remembered, accrues whether the equipment is used or not. Capital hire—interest—on the money tied up in this equipment also must be taken into account. Operations, therefore, should be planned to give mobile equipment the maximum productive use and the minimum of lost time in moving from place to place.

In the old days with hand mining at the moderate depths prevalent in this country, room-and-pillar dimensions were of secondary importance so long as the room dimensions were such that a miner and his buddy could undercut, shoot and load out the face in one shift. No particular roof-control problems were encountered because the unsupported spans were small, the overlying material bedded and either strong enough to support itself or within the support range of wooden props. If pillars showed evidence of weight by spalling, they were increased in size. That pillar and room widths should be the same was a dictum seldom, if ever, questioned. Successful operations under such conditions imposed no greater restrictions than that workings be standardized on 30-ft. rooms and 30-ft. pillars because rails usually came in that length.

Introduction of the cutting machine substituted mechanical power for a difficult human labor task, increased productivity per working place, gave a better product and decreased the mining cost. Since the cutting machine finished a narrow place quickly, however, the percentage of machine time spent in moving from place to place was high. So room sizes were increased and room faces lengthened to reduce these non-productive machine hours. This resulted in double-track rooms so that hand shoveling still could be used; later came conveyors, mobile loading machines and combinations of both types of equipment to take further advantage of the difference between hand-labor costs at $5 per $\frac{7}{8}$ hp.hr. and electricity at about 1c. per horsepower-hour.

In the light of these developments, it is clearly apparent that the trend in mining practice will continue in the direction of working places as long as possible—places where equipment and men may be kept continuously at productive work and where the only non-productive machine time will be that necessary to move the machine and place it in position to operate at the start or the end

* Previous articles in this series appeared in *Coal Age*, October, 1938, p. 33, and January, 1939, p. 38.

of a shift. Proper design and planning of a mining operation today, therefore, depends upon the ability to determine:

1. The maximum size room face or span and the minimum support necessary in room-and-pillar mining.
2. The size of the spans *UP* and P_1P_2 (Fig. 1) and the proper sizes of supports P_1 and P_2 in longwall mining.
3. The proper planning and supervision of cutting, loading and transportation equipment, and the timed movement of roof-supporting units.

Mechanization and the application of barodynamics (behavior of weighty structures) go hand in hand. One complements the other and the judicious use of both is bound to make for safer mining and cheaper coal.

Where perpetual support of the surface is mandatory, some form of room-and-pillar mining must be employed. From the standpoint of mechanization the important consideration in operations of this type is that the rooms be as wide and the pillars as small as possible to support adequately the overlying material. If these dimensions—i.e., room span and pillar width—are determined, then the room may be made as long as one wishes and the rate of advance at the face may be anything desired.[1] In other words, a large production per room may be obtained by concentrating equipment under proper supervision.

Room-span and pillar-width dimensions are determined by: (1) barodynamic tests and (2) structural laws. For barodynamic determination, a knowledge of the structural geology and samples of the geologic structure for testing are necessary. A small-scale model is then built up and run until the roof section of the model fails. From this model, span and pillar dimensions which will result in failure in actual mining operations are determined. The span is then decreased and the pillar dimensions are increased by applying a predetermined safety factor.

Laboratory experimental work had shown that a safety factor of 2, based on barodynamic test, is sufficient for practical purposes. For example, if tests showed that failure occurred with a 4-in. model where the spans represented 100 ft. in the field, then a 2-in. model span representing 50 ft. in actual mining operations would not fail. The same procedure would be followed with reference to pillars.

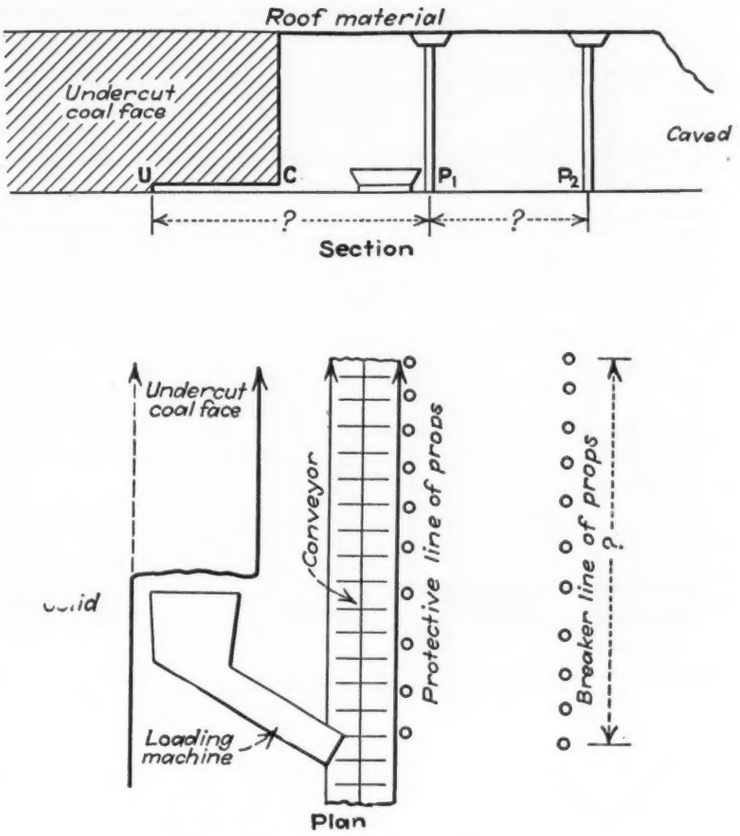


Fig. 1—Section and plan of longwall face.

The application of structural laws already has been described in preceding articles.[2,3,4] Structural engineers estimate their material on the basis of safety factors ranging from 4 to 10. For mining, a safety factor of 10, based on ultimate tensile strength, is recommended for all openings having a long life, such as main entries and inclined shafts. A safety factor of 4 is recommended for room spans; for pillars, the recommended safety factor is 2. These factors may be modified in the future as a result of further research or field practice and they also may be based upon still other considerations, such as the modulus of rupture or compressive strength. At the present stage of development, however, it is believed that the safety factors here mentioned will serve.

How these tests and principles may be applied to the solution of specific problems in roof control is illustrated in the examples which follow:

Where no artificial support is used in a mine having the stratification overlying the coal seam shown in Fig. 2, the limiting width of room is determined by bed *A* and may be obtained from Formula 1†, viz.,

$$Sp=\sqrt[2]{\frac{2T^2S}{W}}$$

With a safety factor of 4, then $S=(200\div4)\times144=7{,}200$ lb. per square foot and Sp for the 2-ft. bed

$$A=\sqrt[2]{\frac{2\times2^2\times7200}{2\times150}}=13.9 \text{ ft.}$$

If bed *A* is to be supported, then the span to be worked is determined by bed *B*. Again using Formula 1, this is equal to $\sqrt[2]{\frac{2\times4^2\times7200,}{4\times150}}$ or 19.2 ft. Determination of the span allowable if artificial support is given to beds *A*, *B*, *C* and *D* is made in the same manner. The span or room size which can then be worked is determined by bed *E*; applying Formula 1, this is found to be equal to $\sqrt[2]{\frac{2\times96^2\times7200}{96\times150}}$, or 96 ft.

This means that, if provision is made for the support of beds *A* to *D*, then the room width may be 96 ft. and the output per 6-ft. cut along the room face, with coal assumed as

[1] Coal Division Transactions, A.I.M.E., Vol. 130, p. 280.

[2] *Coal Age*, January, 1938, p. 61.
[3] *Coal Age*, October, 1938, p. 33.
[4] *Coal Age*, January, 1939, p. 38.

† For explanation of symbols used in this and other formulas see Table I.

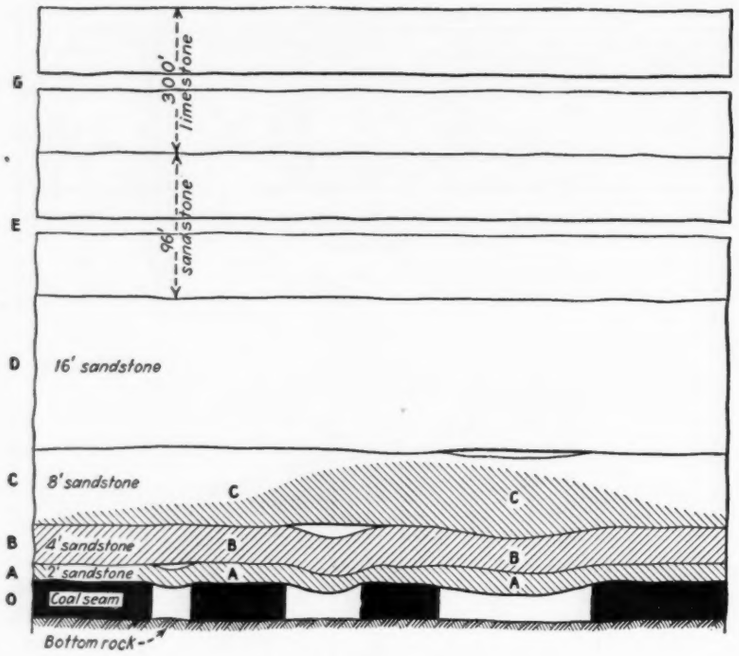


Fig. 2—Typical stratification overlying coal seam.

weighing 80 lb. per cubic foot, would equal $\frac{6x96x5x80}{2000}$, or 115 tons. Efficient planning and supervision may increase the face advance to two and possibly three or more cuts per shift with attendant decrease in cost per unit for proper supervision because barodynamics shows that roof stresses are not materially affected by rate of face advance in a room.

By applying the methods previously described[3,4] it may be determined that bed *D* (Fig. 2), when assuming a deflection which will stress it to 50 lb. per square inch in tension will provide support to itself equivalent to 400 lb. per square foot. Bed *C*, if allowed the same deflection as bed *D*, will provide support for itself equivalent to 238 lb.). If timbers are to be placed the same conditions, 29 lb., and bed *A*, under the same conditions, 3.6 lb. per square foot.

The actual load to be supported in pounds per square foot is equal to the total weight of beds *A*, *B*, *C* and *D* minus the supporting power of these same beds, or 30x150—(400+238+29+3.6), or 3,829.4 lb. (3,830 lb.). If timbers are to be placed at 6-ft. centers, the load per prop will be 36×3830, or 137,880 lb., requiring timber 138 sq.in. in cross section. This load can be supported with 12x12-in. timbers. Since these timbers would be costly and heavy to handle, however, it is suggested that pipe columns 10 in. in diameter and weighing 31.2 lb. per foot, or 156 lb. per prop, be used. These should be capped with wood to allow for roof deflection.

To support this room with steel would require fifteen props parallel to the face at 6-ft. intervals, or approximately 225 props for every 96-ft. length of rooms. The expense of such timbering could be reduced considerably by driving openings which first outlined the block and then retreated toward the entry. This would reduce the maximum number of props required to three lines of fifteen props each, parallel to the face, or 45 props, and the face would be worked as in retreating longwall (Fig. 1). Beds *A*, *B*, *C* and *D* would tend to fail and choke the room behind the props, but support for the surface would still be available from beds *E* and *G* (Fig. 2).

Because of the relatively large pillar dimensions, the roof is not considered a continuous beam in determining pillar width. Working stresses for pillar failure are based on a safety factor of 2. The pillar width may be determined from the following equation:

$$P_w = \frac{L_{OP} x Sp}{C - L_{OP}}$$

where P_w = pillar width in feet, L_{OP}, load above pillar in pounds per square foot = 150x426; Sp, room width or span = 96 ft.; C, allowable stress in pounds per square foot in compression = 1000x144 = 144,000 lb. For these conditions, and ignoring the weight supported on the steel props, the pillar width $P_w = \frac{150x426x96}{144000-150x426}$, or 76.6 ft. It is thus seen that this property may be worked with 96-ft. rooms and 77-ft. pillars.

For inclined deposits, the conclusions set out in the preceding article[4] become important. These may be summarized as follows:

1. All rooms, breasts or chambers should be driven directly up or down the dip to minimize support requirements. This is the practice at present, but mainly because of gravitational aid to haulage and drainage.

2. The amount of artificial support per room driven in this direction varies as the cosine of the angle of dip. For example, with a 30-deg. dip and the same timber spacing as for the flat deposit the area of timber required equals cos 30 deg. x 138 sq.in., or 0.866x138, or 119 sq.in.

3. The room width or span that may be worked varies as 1÷cos 30; the room width that could be used on this dip, therefore, would equal $\frac{1x96}{0.866}$ ft., or 110+ft.

4. Pillar-dimension changes also may be determined in the same manner as outlined under (2).

Where no surface support is required and conditions are as in Fig. 2, with support requirements not excessive, the logical mining method with present-day mechanization is a longface retreating system. For such conditions, the minimum length of face would be 500 ft. As previously pointed out in this series,[1,2] there is no limit to the length of face desirable in longwall operation but

Table I—Structural Characteristics of Beds in Fig. 2

	b	O	ABCDEF	G
Bed or Beds	Bottom rock	Orebody		
Material	Hard sandstone	Coal	Sandstones *	Limestones
Tensile Strength, SO	400 lb./per sq. in.	200 lb./sq. in.	200 lb. per sq. in.	600 lb./sq. in
Compressive Strength, C	5000 lb./sq. in.	2000 lb./sq. in.	2000 lb./sq. in.	6000 lb./sq. in.
Shear Strength, Sb	3000 lb./sq. in.	1000 lb./sq. in.	2000 lb./sq. in.	2000 lb./sq. in.
Modulus of elasticity, E.	5×10^6	5×10^5	10^6	5×10^6
Modulus of Rupture, R	800 lb. per sq. in.	300 lb./sq. in.	500 lb./sq. in.	1500 lb./sq. in.
Weight per cubic foot	150 lb.	80 lb.	150 lb.	150

* Data for slaty sandstones are as follows: tensile strength, 100 lb. per square inch; compressive strength, 2,200 lb. per square inch; shear strength, 600 lb. per square inch; modulus of elasticity 5×10^6; modulus of rupture, 450 lb. per square inch; weight per cubic foot, 120 lb.

there is a definite limit as to shortness.

The general method for determination in workings of this character is illustrated in Fig. 1. From this it may be noted that, with 6-ft. prop spacing and a 6-ft. undercut depth, the maximum span, UP_1 is 12 ft. and well within the support limits of the 2-ft. sandstone bed which carries itself over a 13.9-ft. span. The artificial support required, therefore, is only that needed for the 12-ft. sandstone bed *A*. Procedure for determining this was given in a preceding article.[2] With longwall mining, the maximum load per prop if placed at 6-ft. centers is about 80,000 lb., as compared with 137,880 lb. for room-and-pillar mining. Prop requirements will be satisfied by a 6-in. pipe column weighing 95 lb.+ per 5-ft. prop.

When working with longwall properties where the overlying materials are stressed beyond the elastic limits, barodynamic experiments will give information as to the behavior of all beds up to and including the surface. While the retreat distances for breaks may be approximated by calculation, the more certain methods of finding them are by full-scale field experiments or small-scale model experiment. Both structural calculations and model experiments generally are slightly in error, due either to a definite apparatus error which is known or to an experimental error when determining various moduli which enter into the calculations. These errors, however, are not large and do not appreciably affect results.

Table II—Explanation of Symbols Used in Accompanying Text

Sp	= Horizontal span across opening.
L	= Length of roof for span Sp.
W	= Roof load per foot length and width.
d	= Deflection in feet.
S	= Allowable tensile stress, pounds per square foot.
C	= Allowable compressive stress, pounds per square foot.
Sb	= Allowable shear stress, pounds per square foot.
T	= Thickness of roof beam in feet.
d	= Distance between supports.
I	= Moment of inertia.
D	= Angle of dip of bed.
a	= Angle of opening with strike.
Bd	= Angle of dip of roof in an opening.
b	= Assumed breadth of beam.
E	= Modulus of elasticity.

The importance of knowing the geologic structure and its structural characteristics cannot be overemphasized. If one will reverse the geologic structure shown in Fig. 2—i.e., have 300 ft. of limestone directly overlying the coal followed by 96, 16, 8, 4 and 2 ft. of sandstone—he will find much different spans available for room-and-pillar work underground. He also will find that the support requirements for longwall mining under such reversal would be enormous, because under such reversal it would be necessary to support everything to the surface. This would require such large supporting props that the longwall method would be ruled out. From this it may be concluded that where the beds immediately overlying the coal seam are thin and weak, longwall methods of extraction should be seriously considered; where these overlying strata are thick and strong, however, room-and-pillar mining has the call.

WESTERN KENTUCKY MINE

+ Averages 8½ Tons Per Man-Shift With Mobile Loaders in Thin Coal

WITH mechanization moving forward rapidly in the region, western Kentucky now offers several instances of high output per man-shift as the result of the adoption of mobile loading machines. At the M. B. Brown mine, in Hopkins County, for example, where seam thickness is 3½ to 4 ft. and car changing is done by mules and ponies, two loading machines account for the most of an output averaging 385 tons per shift, with the rest coming from a hand-loading crew engaged in mining out the bad spots. The over-all output per man employed in production and preparation is around 8½ tons per shift. Excluding preparation men and also those engaged in trucking coal from the mine to the preparation plant, average output per man-shift (all men on the mine payroll, including supervisors and office employees) is 9.9 tons on the basis of coal actually shipped, which represents about 97 per cent of that mined.

Outside of picking operations underground on both hand and machine territories, the only preparation at the mine is dividing the output into plus and minus 2-in. sizes. With this screening, the coal is sold to the Charleston Collieries, Inc., which operates one of the few, if not the only, purely stoker-coal plants in the country. The statement that picking is practiced in loading-machine sections might be expanded by pointing out that it is the management's opinion to date that it is better to take some penalty underground in the form of a reduction in machine operating time to allow coal cleaning if this will permit the continued sale of a low-ash (around 6-per-cent) product with minimum complaints.

The M. B. Brown mine is engaged in the recovery of a tract of No. 6 coal under 100 to 250 ft. of cover. This tract was leased from the Memphis Coal Co. by M. B. Brown, from whom the mine gets its name and who is operating manager, and E. E. Bostick, vice-president of Charleston Collieries, Inc. The tract, comprising 1,200 acres, has much the shape of a carpenter's square. The M. B. Brown slope is sunk nearly at the end of one leg of the square, and probably will mine out about one-half of the acreage in that leg. It is proposed in the future to put down a shaft and build

an up-to-date preparation plant on the Illinois Central R.R. about 11,000 ft. east of the slope and near the center of the other leg of the square.

This proposed new operation will be separate from the M. B. Brown mine, although the two will be connected by a main entry now being driven from the Brown side and will work out all the coal not allocated to the Brown slope. As the dip is slightly northeast, a large part of the coal tributary to the proposed shaft will come downhill. The second opening for the new mine will be the present slope, according to plans, with only a hoisting shaft at the railroad and tipple.

Work on the M. B. Brown slope and headhouse was begun in October, 1936, and the first coal was shipped in March, 1937. The first loading machine—a Joy Jr.—went into service Dec. 6, 1937, and the second, also a Joy Jr., was started Dec. 5, 1938. With the two loading machines in service, the mine force (all men on the payroll) was 37, including six hand loaders, at the end of 1938. The average daily output of 385 tons (shipped coal) includes an average 65 tons per day from the hand loaders, who probably will be continued throughout the life of the mine to take care of recovery from bad territories.

Depth of cover over the coal at the point where the slope was sunk was around 40 ft., but the depth to the parting at the bottom of the slope was close to 110 ft., due to the fact that the coal turned up on almost exactly the same pitch as the slope at this point, which was near the outcrop. Consequently, the total length of the slope, driven partly in the coal, is 525 ft. to the head of the parting, while the total hoisting distance from the head of the parting to the dump horns in the headhouse is 600 ft. Inclination of the slope is 25 per cent, or 18 deg. It was driven 5 ft. high and 12 ft. wide and was timbered with three-piece sets (6x8 sawed legs and a corresponding collar in each case) on 4-ft. centers. A parting holding a trip of eight cars was constructed at the bottom, and cars are hoisted one at a time by a 30-hp. single-drum hoist in the headhouse.

● Special provisions for meeting the growing stoker-coal demand no longer are uncommon with progressive coal companies. But a mine producing solely for that market is unusual. That, however, is not the only unusual feature about the M. B. Brown operation described in this article. Mobile loaders with animal haulage account for most of the 385 tons per shift. Coal is hand-picked underground and again on top, where it is screened into plus and minus 2-in. before being trucked 2¼ miles to the Charleston Collieries cleaning plant. There it is again screened, picked, crushed to minus 2-in. stoker sizes, oil-treated and loaded for shipment.

The headhouse noted is designed only for dumping cars and prescreening the coal into two sizes. Built of wood, it includes the hoist, a horn dump, a bar screen and two 50-ton truck-loading bins—one for plus 2-in. and the other for minus 2-in. coal. Each bin is equipped with four loading gates, and the bins are placed back to back so that trucks may be loaded simultaneously from both if desired.

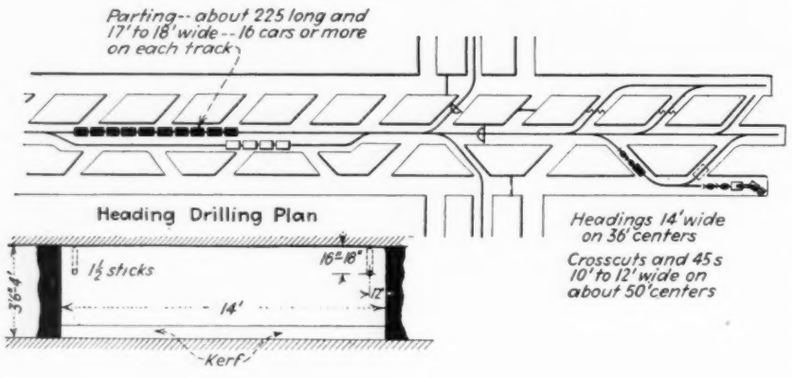
Air circulation is provided by a 6x8-ft. timbered shaft 50 ft. deep and equipped with a 5-ft. Jeffrey "Aerodyne" fan. Operating exhausting, this fan circulates 40,000 c.f.m. at a water gage of ½ in. One of the transformer stations and a 75-kw. General Electric m.g. set supplying the one main-haulage locomotive used in the mine also are located at this shaft. Other surface facilities include a combination supply and lamp house. The mine, although classed as non-gaseous, has been equipped with permissible loading machines and Edison electric cap lamps—the latter primarily for the comfort and efficiency growing out of a steady source of illumination.

The development plan at the M. B. Brown mine is subject, in one respect, to substantial variations from time to time, largely to take advantage of grades in moving loaded cars and also avoid the heavy excavation that would be necessary in cutting down some of the hills encountered. In general, however, the plan is to drive entries to the boundary or other limit and then work back, leaving worked-out areas, water and other difficulties behind. But while retreat operation is the general rule, the direction of driving entries, rooms, etc., may be changed in order to have grades favor the loads. Experience to date shows, however, that hills, bad roof, etc., seem to be concentrated largely in the area near the bottom of the slope, with a lessening of these difficulties as the workings move away from the bottom.

Although the usual thickness of the No. 6 coal at the mine is 3 ft. 10 in. to 4 ft., it occasionally runs a few inches below or above these limits and generally is nearer 4 ft. than 3. The coal itself is rather soft and is without regular banded impurities. However, the seam is featured by balls and lenses of an extremely hard sulphur-bearing rock lying near the roof and known locally as kidney stones. Because of their extremely hard nature and resistance to crushing and slacking, these kidney stones, might conceivably jam a stoker feed screw if they reached the consumers' heating plant. Therefore, picking operations are designed primarily to remove as much of this material as possible, both in the mine and in the preparation plant. The roof is a strong gray shale, except in certain spots where it is broken by slips, etc. Wide places can be driven without great difficulty, although a regular timbering plan has been adopted as a safety measure. The bottom is a very hard sand rock, another reason for dodging hills where possible.

Entries normally consist of three headings 14 ft. wide on 36-ft. centers. Use of three headings even in room work, in addition to providing extra places while they are being driven and facilitating car-handling

Fig. 1—Partings are installed at fairly short intervals in driving entries at the M. B. Brown mine and car-changing is facilitated by tracks in all three headings with crossovers and changing switches close to the face.


Parting--about 225 long and 17' to 18' wide--16 cars or more on each track
Heading Drilling Plan
Headings 14' wide on 36' centers
Crosscuts and 45's 10' to 12' wide on about 50' centers
1½ sticks
16"-18"
12"
14'
3'6"
Kerf

Here a loading machine is working in a room which has just been picked up from a cut-off.

layouts, permits the establishment of partings in the middle opening and thus makes it possible to turn rooms and lay track on the outside headings without the complication of partings. Main-haulage equipment also is kept in a separate opening and all operations connected with room driving can proceed with less interference. Furthermore, extra area for the return air current is provided, as two of the openings are allocated to the return, against one for the intake.

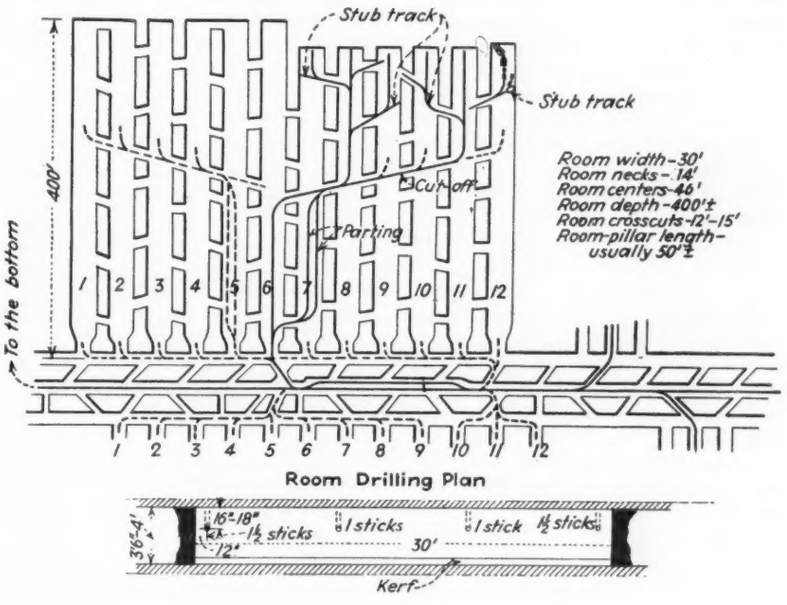
Rooms are driven 30 ft. wide on 46-ft. centers and the usual depth is 400 ft., although shorter or longer rooms are driven where conditions warrant a departure from the standard. Depending upon grades or other conditions, rooms may be turned off both sides of an entry or from only one, but in more cases than not the practice is to turn them from one side only, as usually that is all that grade conditions permit if an inclination favorable to the loads is to be obtained. However, turning from both sides is not uncommon, as illustrated in Fig. 2. Pillars are not recovered. Two rows of posts on 6- to 7-ft. centers normally are set on each side of the track in room work.

Production and auxiliary equipment underground at the M. B. Brown mine is as follows: two Joy Jr. loading machines, totaling 45 hp.; two Sullivan CE7 shortwall cutters with 6- and 6½-ft. bars, 70 hp.; two Little Giant No. 472 hand-held coal drills fitted with Hardsoeg conveyor-type augers, molefoot heads and bits, 3 hp.; one 4-ton Goodman trolley locomotive in a 6-ton frame, 60 hp.; one Chicago Pneumatic track-mounted compressor, 15 hp.; four Myers "Bulldozer" gathering pumps (two 2-, one 3- and one 4-in. units), 30 hp.; eight mules and two ponies not over 46 in. high and weighing 500 to 600 lb.; and 40 wood-and-steel mine cars of the end-gate type ranging in capacity from 1½ to 2 tons. Steel cars number 21 and were furnished by Sanford-Day. All cars are equipped with Timken-bearing wheels. Cutting machines are fitted with Bowdil chains using Bowdil bits. These bits were chosen because of their lower power demand and smoother cutting in addition to their higher output of approximately 6 tons each (in part, however, due to the soft nature of the coal). The hoist, as noted above, is equipped with a 30-hp. motor and the fan with a 10-hp. unit.

All equipment at the mine, with the exception of the haulage locomotive, is powered by alternating current at 220 volts. Direct current is supplied by a 75-kw. m.g. set on the surface. Three transformer stations serve the other surface and underground machinery and feed the workings either through the airshaft or boreholes. The airshaft transformer station consists of three 25-kva. units. One of the borehole stations is made up of three 15-kva. transformers and the other of two 25-kva. units. The a.c. distribution system consists of separate insulated wires, one for each phase, supplemented by trailing cables to the machines where required.

Loading-machine crews are made up as follows: operator, helper; two cutters, who also do the drilling; two drivers; one shot loader and shotfirer; one timberman; one trackman; and a foreman. Cleaning up to complete a place is done by the loading-machine crew, which scraps the bottom as far as time permits, leaving the remainder to the cutting crew. Bottom scrapping is necessary to provide as much working height

Fig. 2—Although not an exact reproduction of the map, this sketch shows diagrammatically how the track layout was adjusted to take advantage of grades in working out a block of rooms. Also shown is the method of driving cutoffs and installing auxiliary partings in rooms, as well as the use of stub tracks to provide changing points close to the face.



Completing a car load in a heading where the coal is about 4 ft. high.

as possible. Cutters also drill the places. In a 30-ft. room, making 25 to 28 tons when cut to the usual depth, four holes are drilled approximately as shown in Fig. 2. Rib holes are loaded with 1½ sticks of 1¼x8-in. Red Diamond No. 11 permissible and center holes with one stick each. Headings, which make around 10 to 12 tons of coal per cut, are shot with two holes placed as in Fig. 1. Each hole is loaded with 1½ sticks of permissible.

Car changing in both entries and rooms is done by spike teams of two mules or two ponies each. Two spike teams serve a loader. In hand sections, the loaders tram their own cars back and forth from the partings, except when a team from a loading machine can be released, which sometimes is possible if the haul is short. In driving entries, the aim is to put in a parting every 250 or 300 ft.; i.e., the partings are that far apart. Parting length normally is around 225 ft., so that they will accommodate two usual-sized trips, or fifteen to sixteen cars, on each track. This applies particularly to partings on entries from which rooms are to be turned. To provide space for the extra track, the chain pillars are slabbed 3 or 4 ft.

In driving main or cross entries from which no rooms are to be turned the parting may be shortened to a seven- or eight-car-trip length if only a few places are to be served, thus cutting down the maximum distance the mules or ponies have to haul before room to put in a new parting is available. If long partings are being put in, the distance from the head of the parting to the last changing switch behind the face may run to a maximum of 600 ft. or more before space is available for installing the next parting. If a short parting is used, approximately 125 ft. can be cut off this maximum distance.

The effective changing distance, however, is not the distance back to the parting but instead is the much shorter haul to a changing switch in a crosscut or 45 deg. behind the face. In driving headings, these crosscuts are put in on approximately 50-ft. centers and track is laid in all three headings as in Fig. 1, with crossovers as necessary to provide the required changing points. With this track layout and two spike teams, one team takes a loaded car out and returns with an empty while the other team stays with the car being loaded. The empty car brought back by the one team is spotted on the connecting track through the crosscut, and as soon as the load is pulled the empty is switched and run to the loader. Usually this is done by hand, as it is quicker as a rule than hitching and unhitching the team in switching. Under this plan, the actual changing distance usually is not more than 75 ft., although the distance to the parting may be much greater. Where the haul to the parting is short, changing may be done by one team in substantially the same manner. Usually, however, two teams are used, as the task normally is too much for one pair of animals.

Measures to reduce car-changing distance in rooms, as well as hauls to partings, take the form of stub tracks and cut-off roads supplemented by auxiliary partings. As a rule, a loading machine is assigned a group of about six rooms, which generally are advanced abreast to the normal depth of approximately 400 ft. While the rooms are being driven the first 200 ft., the "key-room" system, in which a room on each side of the center place is picked up through each crosscut, is usually employed. At the M. B. Brown mine, this is primarily a track-saving measure, as contrasted with mines using locomotives gathering with trips of cars to the loading machine and kicking the loads into the adjacent place until all cars in the trip are filled. In such mines, the key-room system primarily is an aid to quick car changing, whereas at the M. B. Brown mine the trip consists of one car and changing takes place at a switch close to the face.

When the rooms are in about 200 ft., cutoff roads usually are started and auxiliary partings established much as in Fig. 2, which shows how cutoffs were placed in working out twelve rooms by driving six-room groups abreast. The cutoffs were driven from Room 6, and in working out Rooms 1 to 6 an auxiliary parting was placed in Room 5, although as an alternative the parting could have been put in Room 6, and in working out Rooms 1 to 6 an auxiliary parting was placed in Room 5, although as an alternative the parting could have been put in Room 6, except that in this case there would have been no run-around if both parting tracks were blocked. In working out Rooms 7 to 12, the parting was placed in Room 7. With the cutoff in, another track-saving measure, the key-room system was resumed in each case.

Prior to driving the cutoffs and establishing the room partings, cars in the section illustrated in Fig. 2 were gathered to the entry parting. It will be noted that the direction of haulage was reversed to a number of rooms by means of back switches, and that part of the rooms was served from one end of the parting and part from the other. This arrangement, in line with the general principle of operation at the mine, was designed to: (1) provide the shortest possible haul from the changing switch at the face to the parting and (2) to make the grade favor the loads as much as possible.

Rooms are driven with single tracks laid on the center lines and the short car change is made possible by the use of stub tracks laid into the rib or a crosscut as indicated in Fig. 2—usually at intervals of not over 50 ft. For this purpose, West Virginia sectionalized steel-tie

turnouts (December, 1938, *Coal Age*, p. 61) are employed. As these turnouts are divided into four sections and are assembled by bolts, taking one up, moving it forward and laying it down usually is a matter of only a half to an hour's time. Consequently, keeping stub tracks close to the loading point is not a very difficult or costly task. As in the case of changing in headings, the empty car is run in on the stub until the one under the loading-machine conveyor is filled and started to the parting. Track normally is laid on steel ties for perhaps 100 ft. behind the face, beyond which it is caught up on wood ties. Rail weight is 16 lb. in rooms and 30 to 35 lb. on headings and main haulways.

Using changing switches close to the face and installing partings at fairly short intervals have made it possible to establish some very good per-shift car-handling records. For a production of 325 tons from two loading machines in a shift, the average number of car changes is 180. The maximum number of cars loaded by one machine in one shift was 126 up to the end of January, 1939. In connection with servicing loading machines, chain-type conveyors have been considered by the management and eventually may be installed. At present, the one trolley locomotive noted in the equipment list above handles all the haulage between the partings and the bottom. Trip size usually is seven or eight cars.

After the coal is split into two sizes at the headhouse, it is hauled from the storage bins to the Charleston Collieries preparation plant located at Charleston, Ky., on the Illinois Central R.R., a distance of 2¼ miles. The Charleston plant is equipped with five 100-ton storage bins, two of which are for 2-in. lump and three for 2-in. screenings. This plant, in addition to M. B. Brown coal, also prepares the product of one other operation producing a smaller tonnage.

Cutting in a room face. The coal is without banded impurities and is soft, making the output per machine bit high. The cutters later will put in the holes using the drill in the foreground.

From the bins the coal is fed by separate bin door-feed feeders to a main-flight-type chain conveyor, elevating the coal to the head of the tipple. The 2-in. lump, which was prescreened at the mine, is again screened over 1½- or 2-in. step-plate screens and the oversize goes to a picking table, steel-plate type, where four pickers can be accommodated. Then from the picking table the coal goes to a Jeffrey double-roll crusher and is reduced to stoker sizes—minus 2-in.

The crushed lump and egg, now minus 2-in., goes over a Goodyear rubber-belt picking table of about 16 ft. length and is again picked for any impurities. The large coal goes to track No. 1 through an oversize shaker-screen device and the coal smaller than 1½ in. goes to track No. 2, for the small stoker sizes. Before loading into the car, the 2- or 1¾-in. crushed sizes are screened so that no oversize goes into the car. The oversize is returned for crushing.

Coal is given oil treatment by the Viking process at the end of the belt conveyor. The minus 1½-in. coal is double-screened over a Wright double-deck mechanical vibrator and the minus ¾-in., or minus ⅜-in. is conveyed to a single deck 4x7-ft. Wright vibrator, where either 10-mesh or any combination of sizes above that, is taken out, and the resultant grade is made on track No. 3 as "baby stoker," or conveyed by Link-Belt conveying equipment back to track No. 2 and mixed with the grade of stoker being prepared on that track.

This preparation plant produces only stoker sizes of coal: 2-in. crushed, 2x$\frac{3}{16}$-in., 2-in. x 10-mesh, 1½-in. crushed, 1½- or 1¼x$\frac{3}{16}$-in., 1½- or 1¼-in. x 10-mesh, ¾x$\frac{3}{16}$-in., ¾-in. x 10-mesh, ⅜-in. x 10-mesh. In addition, regular 2-in., 1½-, 1-, and ⅜-in. screenings can be shipped. A magnetic plate is on the main discharge end of the conveyor to catch any tramp iron before the coal goes over the screens. All sizes can be thoroughly oil-treated. A 10,000-gal. oil-storage tank is on the property.

Two bins receive the output of the M. B. Brown mine after it is hoisted and screened into plus and minus 2-in. sizes. From these bins the coal is trucked to the preparation plant of Charleston Collieries, Inc.

PROGRAM

16th Annual Convention of Practical Coal Operating Men and National Mining Equipment Exposition

AMERICAN MINING CONGRESS

Music Hall
Cincinnati, Ohio
April 24-28

MONDAY • APRIL 24 • MORNING

Chairman: Julian D. Conover, secretary, American Mining Congress.

Introducing—Howard I. Young, president, American Mining Congress.

William J. Jenkins, president, Consolidated Coal Co., and national chairman, program committee.

R. L. Ireland, Jr., president, Hanna Coal Co., and chairman, Coal Division.

Roy L. Cox, vice-president, Jeffrey Mfg. Co., and chairman, Manufacturers' Division.

Roof Problems and Timber Recovery

George A. Brown, mine superintendent, Union Pacific Coal Co.

Machine Maintenance — Practices, Procedure and Records

Ernest Prudent, electrical engineer, Bell & Zoller Coal & Mining Co.

Stream Pollution

J. W. Woomer, chief mining engineer, Hanna Coal Co.

MONDAY • APRIL 24 • AFTERNOON

Surface Preparation

Coal Preparation

P. D. Everly, superintendent of preparation. Island Creek Coal Co.

Some Factors Affecting Results When Air-Cleaning Fine Coal

D. H. Davis, chief chemist, and V. D. Hanson, assistant preparation engineer, Pittsburgh Coal Co.

Dewatering to Prevent Freezing

Otis Bledsoe, chief engineer, Binkley Mining Co.

TUESDAY • APRIL 25 • MORNING

Guniting to Prevent Slate Falls

C. W. Jeffers, general superintendent, United States Coal Co.

A Worker's Idea of What a Mine Foreman Should Be

James Duffy, motorman, Buckskin Coal Co.

New Developments in Coal Stripping

C. M. Guthrie, superintendent, Seneca Coal Co.

TUESDAY • APRIL 25 • AFTERNOON

Conveyor Mining

Engineering Studies and Conveyor Cost Analyses

T. F. McCarthy, general superintendent, Clearfield Bituminous Coal Corporation, and C. P. Brinton, mining engineer, Barnes & Tucker Co.

Symposium on Conveyor Loading

(a) Mechanical Loading

Harold McDermott, vice-president, New Castle Coal Co. and Stith Coal Co.

(b) Hand Loading

A. H. Whitt, general superintendent, West Virginia Coal & Coke Corporation.

(c) Self-Loading Conveyors

T. F. Christian, general superintendent, West Kentucky Coal Co.

WEDNESDAY • APRIL 26 • MORNING

Culm Flushing and Backfilling

Henry A. Dierks, Pierce Management.

Organizing the Supervision of Mechanized Mining

Frank E. Christopher, president, Christopher Mining Co.

WEDNESDAY • APRIL 26 • AFTERNOON

Mechanical Loading

Production of Domestic Sizes With Mechanical Loading

George M. Smith, mine superintendent, Peabody Coal Co.

Service Haulage

(a) Shuttle Haulage With Rubber-Tired Cars

W. A. Vinson, general superintendent, Hart Coal Corporation.

(b) Dual Haulage With Service Cars

John H. Evans, mine superintendent, Wasson Coal Co.

Choice of Mining Systems for Track-Mounted Equipment

S. M. Cassidy, manager, Weirton Coal Co.

THURSDAY • APRIL 27 • MORNING

National Economic Problems

Benefits of Mechanization to the Coal Industry

L. E. Young, vice-president, Pittsburgh Coal Co.

Merits and Demerits of Federal Regulation of the Coal Industry

George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co.

THURSDAY • APRIL 27 • AFTERNOON

Safety and Supervision

Safety Rules, Standards and Inspection

J. J. Sellers, vice-president, Virginia Iron, Coal & Coke Co.

Securing and Maintaining Employee Cooperation in Safety Work

C. J. Flippen, safety director, Fuel Department, Norfolk & Western Ry.

Standardizing State Examinations for Mine Officials

James C. Gray, mine superintendent, Tennessee Coal, Iron & Railroad Co.

FRIDAY • APRIL 28 • MORNING

Exhibitors' day—no convention sessions—list of exhibitors on p. 81.

FLOOR DISCUSSION

The floor committee is scheduling the time assigned to each subject so as to provide ample opportunity for full floor discussion immediately following each paper. Everyone present at the convention is invited and urged to ask questions of the speakers and to participate in the floor discussions, which will be entirely informal and extemporaneous.

HUBER CENTRAL BREAKER

+ To Prepare 7,000 Tons Of Anthracite Daily

• To clean all sizes in a manner that will give utmost satisfaction the Glen Alden Coal Co. has added to its several cleaning units another large breaker which, like the others, has a separate unit or units for every size, a method long recognized as giving maximum control of the ultimate product. Large sizes are loaded by belt booms and not stored in big pockets. A film, thin as a cobweb, but indestructible, is sprayed over the coal to give it a peacock-blue appearance which identifies it.

By R. DAWSON HALL
Engineering Editor, Coal Age

MODERN in both architectural design and operating details, the new central Huber breaker of the Glen Alden Coal Co. in a striking manner combines simplicity and efficiency and provides not only for the production of a highly marketable output but also for lower handling cost. Preparation to meet every demand of today's exacting markets with their nationally advertised, trademarked "blue coal," however, was the cardinal objective in replacing the old wooden Maxwell breaker at Ashley, Luzerne County, Pennsylvania, with this entirely new steel-frame building named for C. F. Huber, chairman of the Glen Alden board.

In addition to keeping cleaning and sizing in tune with the times, the company also faced the problem of combining production from the original Maxwell twin shaft with the output from the Buttonwood and Inman shafts for central cleaning. Since the existing Maxwell breaker did not lend itself to extensive modernization, new construction appeared less costly than refurnishment might have been. Certainly the Huber breaker will afford more satisfactory results, longer life and greater economies.

Unusual Features

The Huber breaker is among the first anthracite preparation plants to treat all its sizes separately with Menzies cone separators, the basic principles of which were evolved by W. C. Menzies at the Nottingham colliery of this same Glen Alden Coal Co. several years ago. Important improvements, however, have been made since that time.

A somewhat unusual feature in the Huber breaker is the absence of bins for the larger sizes. Egg, stove and chestnut each are delivered to railroad cars by separate long belt booms, 4 ft. wide, which can be lowered at the delivery end into the car. By this means, an important source of degradation is eliminated and greater uniformity in sizing is preserved. Bins are provided only for the smaller—pea, buckwheat, rice and barley—sizes.

Producing a clean free-burning low-ash coal, the mineral matter of which is almost infusible in the domestic furnace, the company naturally and rightly is desirous of identifying it as its own high-grade fuel, so that the consumer can recognize it at a glance and that no inferior product has been mixed with it. Hence, at the breaker, every particle of all the sizes above and including pea is covered with a peacock hue iridescent coating of inconceivable thinness, guaranteeing the consumer that he is getting genuine D.L.&W. "blue coal."

Reagents from two carefully calibrated pumps are mixed in regulated quantities, so as to produce the film on the coal. Yet this film is so thin as in no way to modify the quality of the fuel or prevent inspection of each individual piece. After the treatment, the coal is sprayed, but the coating, being both insoluble and adherent, is not removed.

Mine rock usually contains a fair proportion of clean coal, and, to prevent that percentage from being wasted, arrangements are made for passing it on the night shift over tables where the coal can be picked out of the mass of broken rock with which it has been loaded. About 10 per cent of the present mine rock is clean coal which deserves more considerate treatment than relegation to the rockpile. Rock is held in the mine in cars during the day and is dumped through the rotary coal dump at night. After the separation, all the rock is conveyed to the rockpile, while the coal retrieved falls into a bin and is passed through the breaker during the day.

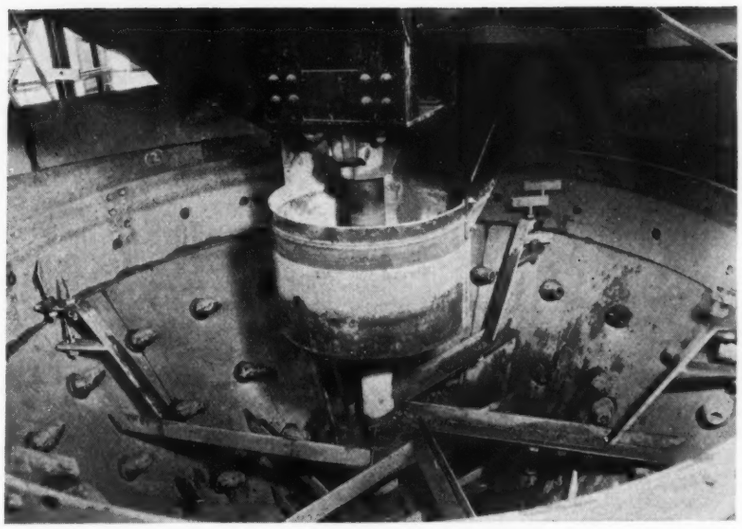
Output From Three Mines

Buttonwood and Inman collieries, which together employed about 1,200 men, have been shut down since Aug. 31, 1938, and the Buttonwood breaker, that served also for Inman, likewise of wood, has been dismantled. Maxwell colliery, now to be given the name of Huber, employed about 1,600 men. Work on the new breaker started more than a year ago and construction proceeded without disturbing the operations of mine or breaker until July 13 of last year, when both surface and underground workings were suspended. On Feb. 1 of this year the mine and breaker began delivering coal.

Coal from the Buttonwood and Inman collieries is discharged from bottom-dump cars spotted on two adjacent tracks. From four hoppers this Buttonwood coal passes to

a chain scraper conveyor and is lifted to a point in the raw-coal-assembly building. Here it meets coal from the Huber twin shaft and coal also from No. 5 slope, which coals have been transported likewise by separate chain scraper conveyors. Coal, after it leaves No. 5 slope, is backswitched onto a four-car revolving dump which delivers it to the conveyor.

The assembled coal is delivered by a chain scraper conveyor 450 ft. long, to the top floor of the Huber breaker, which is at an elevation of 117 ft. above the rail. Preference is shown to a scraper conveyor because its carrying capacity allows it to run at a lower speed—102 ft. per minute—than a belt, and thus it will not break the coal as much at the point of delivery. A 350-hp. General Electric motor drives the chain scraper conveyor, which has 5-ft. blades, through an 18-in. Link-Belt silent chain.



Interior of a cone showing the agitator nozzles by which the water is set in active motion and the central well through which coal enters the cone.

On arriving at the top deck the coal stream is split in two directions, part going to the right side and part to the left side of the breaker. Each of these halves passes over a bull shaker with 6½- and 5- or 4¾-in. circular-mesh screens. All that passes over the 6½-in. perforations is lump; that which passes through the 6½-in. holes and over the top of the screen with the smaller perforations is steamboat or, in local parlance, "steamer" coal.

Finer sizes go to the screens on a lower deck but the plus 6½-in. coal on each side of the breaker goes to one picking table and the intermediate size to another. This separation of lump from steamboat is made not to aid hand cleaning, for both sizes could well be cleaned together, but to keep each size separate for breaking in crushers set to accommodate that particular measurement.

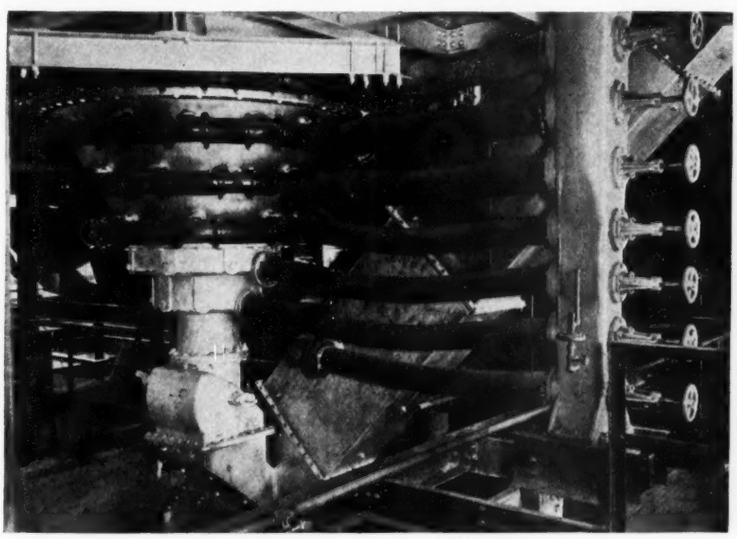
Impurities are picked out of the coal mass by hand. They are not, as at some breakers, pulled off the edge of the table by toothless rakes, as actual picking is believed to be a more accurate procedure. Rejects are dropped into pipes which deliver to a bigger pipe which receives material from all four tables and carries it to the refuse-disposal bin. Picking tables are 3½ ft. wide and have a stroke of 4 in.

Coal from the lump table on each side of the breaker goes to a pair of rolls 42 in. wide and 32 in. in diameter equipped with sparrow-bill teeth which reduce the lump to steamboat size. Centers between these rolls can be changed, when the rolls are idle, to modify the size of the product as desired. Coal from the steamboat picking tables goes to two other pairs of rolls like the first set, one on each side of the breaker, which, however, have their centers nearer together so that steamboat will be reduced to broken. All rolls have structural-steel housings, making them easier to open and yet stronger than if cast iron were used.

Coal from these rolls goes to the next deck, where it is rough screened on short shakers; the steamboat and large broken size goes to egg rolls and the small broken and egg to stove rolls. Screenings from the bull shakers go to the mine-run screens, where they are separated into broken, egg, stove and chestnut, the smaller sizes going to the fine-coal plant. Broken and egg are passed over picking shakers, where iron, wood and other material that might damage the rolls are removed. The main purpose of the work on this floor—the third from the top—is to remove the fine coal and to prepare the larger sizes for breaking to the sizes that are to be marketed.

On the fourth floor from the top are two stove and two chestnut rolls to use when the market requires no egg or stove; also one of five tanks in which are settled the fines from broken, egg, stove and chestnut shakers. This material goes to the fine-coal plant, which is in a separate bay of the breaker and is not in duplicate. It has six fine-coal

One of the cones showing its several agitator bustle pipes, water from which keeps the coal in suspension; the boot into which the refuse falls and the watertight casing for the refuse elevator.



shakers which separate pea, buckwheat, rice and barley.

Six long shakers on the floor below—the fifth—separate egg, stove and chestnut, which pass respectively to one egg, two stove and three chestnut Menzies cone separators. In the fine-coal bank also are six units of this type—two for pea, two for buckwheat, one for rice and one for barley. The practice of the Glen Alden has been to wash each size in a separate unit, because in that manner the cleanest coal is obtained and the greatest efficiency afforded. On this same floor the dewatering shakers are located. Coal going to the tailings cone is of egg or stove size, and after cleaning it is crushed to chestnut and sent back to be mixed with the other feed for rewashing.

In the Menzies equipment (see *Coal Age*, February 1935, p. 59) the water can escape from the pressure imposed on it either by pushing its way up through the mass of coal and heavier material in the cone or by traveling up the inclined watertight casing by which the conveyor removes the refuse. If the cone contains too much heavy material, the water is able to pass up through the alternative path. Hence, any increase of heavy material will fall and be drawn out by the refuse conveyor.

Though most of the equipment has its own individual drives, and the breaker has in all about 100 motors, there are nevertheless two small groups of rubber-belt drives, one on the right and one on the left. With individual drives for each unit, the failure of one would not affect the others, but the failure of any one in the group would put all the others out of step. One cannot elect to clean all but, say, chestnut without a provision to store the chestnut which continues to be delivered either separately or mixed with other sizes. So the failure of one unit in any one group makes necessary the shutting down of the entire group. For this reason individual drives in some instances lose much of their appeal, in the opinion of the management.

Parrish arms are used for suspending shakers and the connecting rods are constructed almost wholly of wood. Hand lubrication is general, as the management finds it more economical than other lubrication methods. All chutes are of steel. A non-abrasive Bethlehem steel is used in the chute bottom and a mild steel on the sides.

Instead of sprays, water boxes are used with rows of 13/16-in. holes, the water from which falls on a cross diversion plate which, being set almost plumb, delivers the water on the screen as a sheet or as a number of small streams without pressure. When sprays are used, it is said, they crowd the material, and with a crowded mass not only is the passing of the undersize through the screen delayed but abrasion is increased.

All 3/32- to 1/32-in. barley is taken out of the coal and sent to the Huber boiler plant. Mine water is used throughout the breaker after treatment with powdered high-calcium hydrate. About 7,000 g.p.m. can be provided by the pumps for make-up water, though for a while, with a 5,000-ton production, 5,000 g.p.m. may suffice. The general rule is one gallon per minute for one ton cleaned per day, but this is merely make-up water; an average of 8,200 g.p.m. of circulating water is needed per cone.

Coal from this plant is hauled in railroad cars up the Ashley planes of the Central Railroad of New Jersey. All sizes above buckwheat are trademarked, as has been described, within the body of the breaker. Pea, however, is trademarked before it goes to its bin, for, like all the small sizes, it is thus stored. The finer sizes are not coated with this identification sign. Arrangements are made for spraying these sizes during the winter with calcium chloride to prevent freezing. Disposal of breaker waste and mine rock will be discussed in another article.

Power for driving the Huber breaker will be provided by its own plant, though high-tension equipment will be installed both for distribution of the current generated and for tying in with the present network. Current is delivered to the breaker through two 2,000-kw. banks of transformers so that the plant will receive 440-volt 3-phase 60-cycle power.

Switchboard Equipment

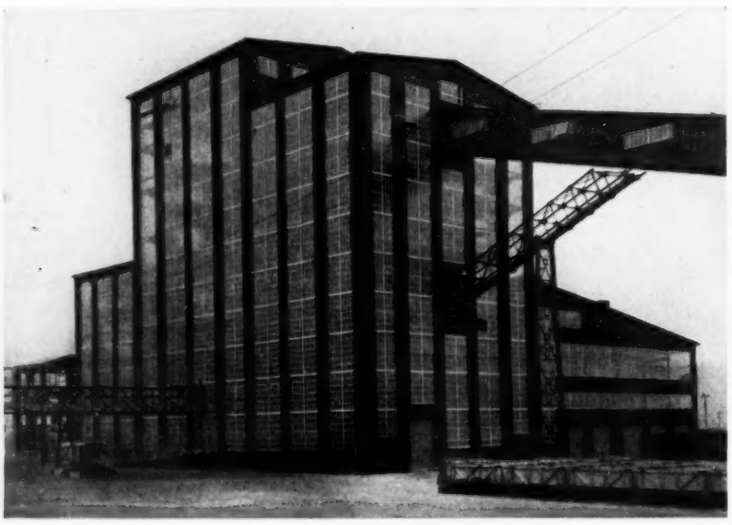
Each bank of transformers supplies power to a separate switchboard equipment with De-ion circuit breakers with a rupturing capacity of 20,000 amp. which control the circuits to the distribution panels, which in turn control the circuits to the various motors. Distribution panels will have De-ion breakers with a rupturing capacity of 10,000 amp.

In certain of these circuits 4-per-cent reactors are introduced as a means of limiting short-circuit current. Starting equipment for the smaller size of motors has been designed especially with the purpose of limiting the short circuit possible with this equipment.

The two group drives each will require 200 hp. The six 12-ft. cones for the larger size coal will each require a 100-hp. drive, the six 10-ft. cones for the smaller sizes have each a 75-hp. drive, and the two auxiliary cones, which are 8 ft. in diameter, each will require 50 hp.

All the cones as well as other preparation machinery were made in the Glen Alden's own shops at Exeter, Pa., under the Menzies patents. A Dorr thickener, 120 ft. in diameter, settles the circulating water. Carrier unit heaters warm the building, which is covered by Robertson protected metal. The plant was designed by the company's own engineers.

Outside view of the Huber breaker.



KOPPERSTON MINE

+ Planned for Two-Seam Operation

With Ultimate 8,000-Ton Capacity

By F. S. FOLLANSBEE
Chief Engineer
*Pittsburgh Coal Co.**

and H. J. HARPER
Project Engineer
Koppers Coal Co.

• Modern mines, unlike Topsy, don't "just grow." Between the first core-drill sample and the first car dumped over the tipple lie months of study, planning, development and construction. In the case of Kopperston, the job included building 20 miles of railroad into virgin territory, moving creek channels, erecting the mine structures and creating a new community where men may live in comfort. The story of Kopperston from the initial selection of the 10,000-acre tract being worked to actual mining is here told for the first time by two of the engineers who practically lived with the job from its start. Recoverable tonnage and proposed operating schedules give Kopperston a life expectancy of approximately 40 years. Planning and development have been projected with that life span in view.

KOPPERSTON mine of Koppers Coal Co. is located in Wyoming County, West Virginia, on Clear Fork of the Guyandotte River. The property consists of a 10,000-acre lease which has two seams of coal of excellent quality, both of which will be mined. Present workings are in the Big Eagle seam, but plans have been made to work the Campbells Creek seam over the same tipple. This property was situated 20 miles from the nearest railroad and, of course, is in virgin territory. The tipple is in the narrow Toney Fork valley between two ridges of Walnut Gap Mountain, and at the time work was started this site was almost woodland except for scattered clearings around the homes of a few residents.

Before any development work was done, this property was thoroughly prospected to determine the thickness and quality of the various seams of coal. Openings were made along the outcrops, where the thickness was measured and samples taken for analyses. A sample mine also was started and a quantity of coal sufficient to mke coke-oven tests was mined and trucked to the railroad for shipment.

Field Work Started in 1937

When the management was satisfied that the coal was suitable and would meet the requirements of the market, the engineers were sent on the property to make the necessary surveys and collect the information for plant layout. The field engineering work began Feb. 12, 1937. Plans for the construction of this plant were started immediately and so arranged that it would not be necessary to haul in equipment by trucks but that everything would be ready for construction by the time the railroad would be able to deliver material on the site. Topography was taken over the entire valley for a distance of three miles and this information was used for laying out the town, plant buildings and mine tramroads.

The construction of the branch railroad was completed to the tipple site on June 10, 1938. During the period of railroad construction the townsite, shop yards and tramroads were graded and the excavation was completed for the tipple. Originally the creek meandered over the valley with streams flowing in from both sides. A new channel for the creek was dug near the base of the hill on the side next to the railroad and the streams from the opposite side of the valley were brought across to the main channel in masonry flumes.

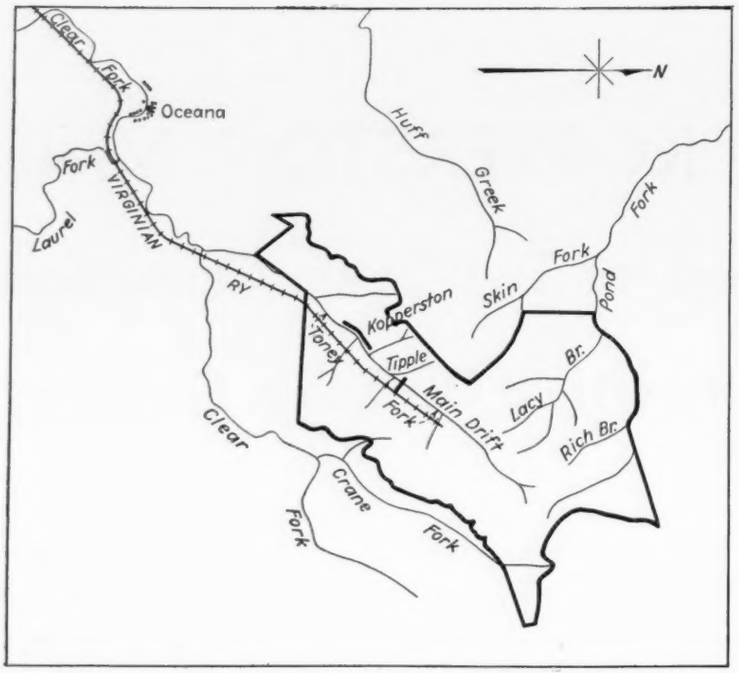
Roadbed for 20,000 lin.ft. of tram tracks for the mine was cut around the mountain so as to provide openings for quick development of the mine without the necessity of driving entries and stocking coal. In preparing the site for the plant, 561,000 cu.yd. of unclassified material was excavated, 7,537 cu.yd. of stone masonry and 235 cu.yd. of reinforced concrete placed.

Construction of the plant was in reality six separate features: (1) excavation and drainage of the tipple track yard; (2) preparation and development of ten pairs of drift mouths with the necessary tram tracks to the tipple; (3) design and erection of the headhouse, conveyor gallery and lower tipple; (4) purchase of mine equipment; (5) erection of the necessary mine buildings; (6) housing program.

The first excavating work was the preparation of the tipple track yards and the supply track to the shop yard. Space was prepared for six empty tracks above the tipple and six loaded tracks below. Six tracks will be necessary for the ultimate production of 8,000 tons per day. At present two tracks at the tipple are being used and the others will be added as the production increases.

Development of the mine workings before production was started on Nov. 15, 1938, consisted of driving ten pairs of entries through crop coal and turning one breakthrough inside. Five pairs of these entries were for temporary production pur-

* Chief engineer, Koppers Coal Co., 1923 to 1938, inclusive.



Map outlining the 10,000-acre lease and showing the location of town, tipple and mine—partly in Wyoming and Boone counties.

poses and also for developing the main entry. These temporary drift mouths were timbered with wood and will be abandoned when the permanent main haulway is developed. Five pairs of permanent drifts were prepared and stone masonry portals were constructed. These five pairs of permanent drifts will be used throughout the life of the property. The main haulway is approximately at right angles to three of the temporary headings. As the temporary headings cross the projected line of the main heading, places will be started both ways. This will permit development of this heading to be carried out very rapidly and also allow the first 4,000 ft. to be graded before any permanent track is laid.

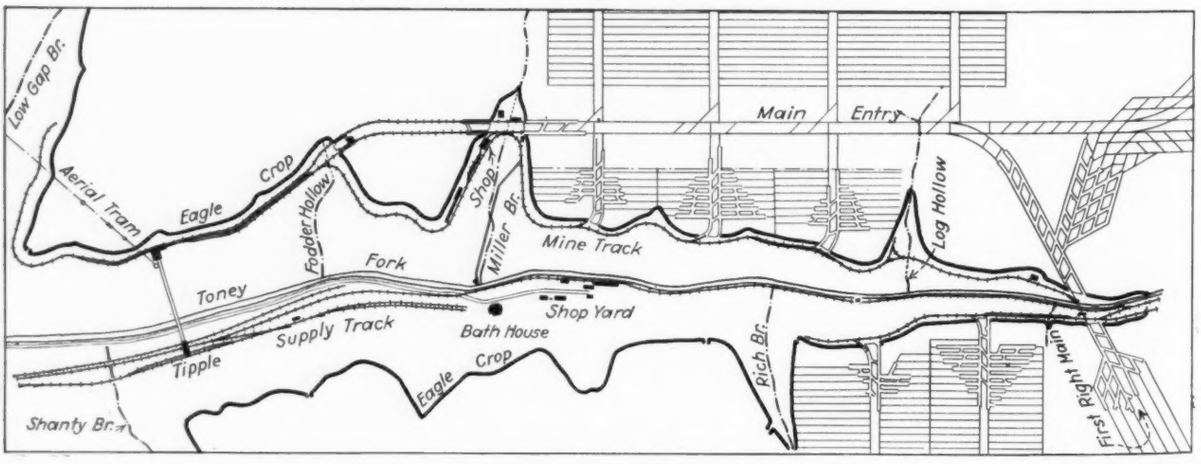
Ventilation at present is accomplished by a small disk fan in each pair of entries. When more ventilation is required it will become necessary to install a permanent fan at the entries provided for this purpose at the head of Toney Fork.

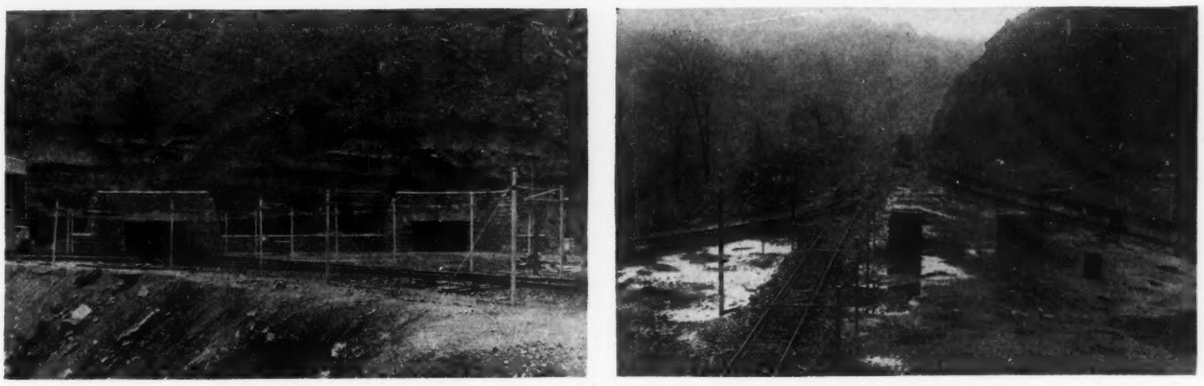
The tram track layout consists of a supply track from the shop yard up the valley to the mine level to facilitate handling of supplies from shop yard and railroad siding. An outside tram track reaches from the headhouse to all the ten pairs of entries. At the headhouse there are three tracks, two for storage of loaded trips and an empty track for return to the mine. There is room on the loaded tracks for 150 loads. Beyond the dump there is storage space for 110 empties. The tram track was laid with 60-lb. rail on 6x8-in. creosoted oak ties and bonded throughout by wedge-type bonds. All switches were laid with switch tie sets of creosoted oak. No. 9 section grooved trolley wire was used on all the tram tracks. The trolley-wire supports on single track consisted of a 3-in. double-strength galvanized pipe with a fabricated-steel mast arm. On sidetracks and double track, the trolley wire is supported by a suspension system held by two galvanized-steel pipe poles outside the clearance lines of the track.

At present, the coal-handling plant consists of a headhouse, conveyor gallery, lower tipple, rock conveyor and bin, and aerial tram for disposal of refuse and mine rock. The dump is on an elevation of 2,075 ft. and the railroad tracks at 1,847.58. The distance from the center line of the dump to the point of discharge on the screen is 540 ft. Coal is dumped by a 2-car rotary dump into weigh baskets. The dump hopper is arranged with a gate to bypass mine rock to a conveyor which carries the rock to a bin over the loading terminal of the aerial tram.

From the weigh baskets the coal is dumped on the run-of-mine feeder which delivers to the belt conveyor. An arrangement under the weigh baskets also permits cars of coal to be bypassed to the jury table for hand-picking to determine the quantity of impurity per car and thereby keep a check on the preparation of coal in the mine. After

Initial plan of development for connecting up main entries and permanent haulage to the tipple at Kopperston, the Koppers Coal Co.'s new mine.





Left—Stone-masonry portals which are a part of the main haulage entry system. Right—The two tracks in the foreground extend from the main entry haulageway into the yard system at upper center, leading around the hill to the tipple. The track at extreme left connects with development drift opening along the outcrop of the hill from which this picture was taken.

picking the coal on the jury table it is then returned to the run-of-mine feeder.

Coal travels from the headhouse to the screens in the lower tipple over a belt conveyor on a slope of 15 deg. 11 min. down. This belt is 48 in. wide, running over idlers equipped with roller bearings. Certain of these idlers are so constructed as to keep the belt on line automatically without manual adjustment. This belt runs in a steel gallery supported by steel A frames set on concrete piers.

Planned With Eye to Future

The lower tipple, as now arranged, loads run-of-mine coal, but could be arranged to load two sizes. The coal is screened now for the purpose of picking the larger sizes and then reassembled for shipment. As breakage is not important, the coal is loaded into the railroad cars by chutes. However, if breakage and degradation become important, loading booms will be added. Arrangements also have been made to allow a cleaning plant to be installed if it becomes necessary.

This coal-handling equipment is designed to have a capacity of 4,000 tons per day on a two-shift basis. However, arrangements have been made and the equipment and structures designed to handle the coal from the Campbells Creek seam, when opened, over the same conveyor gallery. This conveyor gallery is being constructed wide enough to allow another 48-in. belt to be installed to carry the Campbells Creek coal to the lower tipple. The headhouse was also arranged to leave space for extending the future conveyor through to the future Campbells Creek headhouse. At present, lower tipple facilities are arranged for the Eagle coal only; when the upper seam is opened, an addition to the tipple will be constructed with the necessary screens and equipment to handle 4,000 tons from this upper seam. As stated in a preceding paragraph, roadbed has been graded for four additional tipple tracks, which will be laid to take care of the larger tonnage.

In purchasing equipment for the Kopperston operation an attempt has been made to standardize as much as possible on equipment that has been found to be satisfactory for like conditions in other mines of the company. Coal is cut by track-mounted machines with 9-ft. cutter bars. This type of mining machine was selected as it may become necessary to cut the coal at different points in the seam in various sections of the mine.

Haulage will be taken care of by two types of locomotives. Gathering locomotives are 8-ton outside frame type, equipped with rheostatic drum controllers, line breakers and gearless cable reels, with a height of 26 in. over the rail. Main haulage locomotives are 20 tons, equipped with two 170-h.p. motors, air sanders, air brakes and semi-electro-pneumatic controllers. These main haulage locomotives are only 39 in. in height over the rail and were so constructed to allow the motorman to have the best field of vision possible.

Use 4-Ton Steel Cars

Steel mine cars of 4-ton capacity equipped with steel axles and automatic couplers were purchased. The automatic couplers are arranged that the cars stay coupled at all times except when the release is held open by the brakeman. It is felt that the hand-release feature was necessary in the interest of safety. Portable air compressors are used for drilling slate when top is being taken and electric coal drills are used on the sections where loading machines are used.

Direct-current power is furnished to the mine by three 300-kw. motor-generator sets. Transmission lines to the substations are constructed of creosoted pine poles with aluminum wire. As future substations will have to be built, the transmission lines will be extended. Care has been taken to construct the first section of this transmission line with wire large enough to carry all the future substations and eliminate reconstruction of the present lines. The a.c. current on these distribution lines is 4,000 volts and the motors on the motor-generator sets also are 4,000 volts, to eliminate the use of transformers at all substations.

Mine-Building Program

Definite plans have been made for the mine buildings needed for this plant for a production of 4,000 tons from the Big Eagle seam. However, as this production will not be reached for some time, all these buildings were not erected but care has been taken to leave space for each proposed building. It also was necessary to erect certain temporary buildings to serve the mine until the permanent buildings could be built. A temporary office building and quarters for the engineers and foremen were built in June, 1937, and a camp for the construction crews in the early part of 1938. In all, nineteen buildings were constructed in this camp, two of which are used by the Koppers Stores Division as a temporary store. Temporary plant buildings, consisting of a supply house, bulk material building, tool-

house, sandhouse and machine shop, were built to care for equipment and supplies during the construction period.

As soon as the railroad was completed so that materials could be shipped in, the construction of permanent buildings was started. Two substation buildings were erected, each large enough for two motor-generator sets. As these two buildings will be used the entire life of the mine they were built of native stone and were started before the other permanent buildings.

The service shop for the Eagle seam mine is built of steel and brick of modern design near the Miller Branch drift mouth. This building is equipped to take care of all ordinary repairs. Some of the major features of this shop are a 7.5-ton electric overhead traveling crane, motor pit, bake oven and dipping pit. The machinery consists of two lathes, drill press, wheel press, electric welder, shaper, power hacksaw and other necessary small tools.

A steel motor barn with eight stalls was erected near the service shop to store the locomotives and with space for storage of some of the electricians' equipment. Two brick magazines were built for the storage and distribution of explosives.

Bathing Facilities for 1,200

Bathing facilities have been provided for 260 men by a brick bathhouse combined with a self-service lamphouse. This bathhouse is the first section of the proposed building. Four more sections are planned and will be built as the need for them develops, making the final structure able to accommodate about 1,200 men. Water will be furnished to this bathhouse from a deep well near by. This deep well also furnishes water for the construction and engineer's camp.

Men walking from the bathhouse and lamphouse to the mine are aided by a covered walkway. The combined length of the ramp and stairs of this walkway is 1,300 ft. This will enable the men to travel from the bathhouse to the mine in rainy or snowy weather without getting wet. The main feature, however, is to provide a safe place for men to walk up and down the hill in icy weather.

All employees, including contract workers, are required to punch time clocks. These clock stations are placed at the two mine entrances and one in the shop yard for all outside employees. A safety-clock is installed at each station with which each employee must record at the end of each shift whether he has been injured or not. This clock is installed to keep the idea of safety before the employees daily.

In laying out the housing for the mines a carefully detailed plan has been followed. Space has been graded for 350 houses, varying in size from four to seven rooms. The plan also is arranged to provide space for a grade school, high school, stores, service stations, offices, first-aid building, water-treating plant and clubhouse. A complete building program also was determined. The construction for the first year included a store, service shop, a water-treating plant and an initial group of 100 houses.

100 Houses Already Erected

Forty five-room houses and 60 four-room houses have been built. All houses are equipped with bathrooms and utility rooms. The utility rooms contain a coal furnace which heats the entire house by a system of forced circulation. The furnace also heats water for the bathroom and kitchen. Changes in exterior plans were carefully arranged and, with a variety of color schemes, the town presents a very pleasing appearance.

All streets and roads in the town and from the town to the mine have been paved with Tarmac. Concrete sidewalks extend to each house and to the store. Street lights have been installed on all streets and along the road to the shop yard at the mine. To make the town more attractive, all street-lighting circuits and telephone connections on the main street have been installed with underground cables. In passing along the main street only the ornamental street-lighting poles appear in front of the houses.

Finding a water supply for the town was quite a problem. The stream flowing down the valley goes dry for three months each year. If water from the creek were used, a storage reservoir to hold a three-months' supply would have to be provided. The requirements for the three-months period would be about 60,000,000 gal. As the creek water could be handled by gravity through a treating plant to the town, it was decided that this would be the plan finally adopted. Storage of the water is to be taken care of by an underground reservoir made by mining a portion of the coal seam, leaving pillars standing, and then filling it by gravity from the stream during periods of high water.

Preparing this reservoir will take about five years. To provide water for the town during the first three years, a deep well has been drilled and a treating plant installed. Water pumped from the deep well is aerated, filtered and treated with lime and chlorine. A centrifugal pump lifts the water to a 52,000-gal. storage tank from which it flows by gravity to all points of use. The maximum pressure is 98 lb. and the minimum 38 lb. All water lines over 2 in. in diameter are bell-and-spigot cast-iron pipe. Ample fire protection is provided by 20 standard fire hydrants spaced uniformly through the town.

Sewer lines have been installed to all houses and are connected to a main sewer line which parallels the main street. As the town is extended the sewers also will be extended.

A store and service station has been built at the upper end of the present group of houses. This store will serve the needs of the community until houses are built further down the valley, at which time a store will be built in the center of the town and the present building will then be utilized as a branch store.

Safety Equipment Obligatory

All men employed at the mine are required to have such equipment as is necessary to provide for their personal safety. Hard hats, safety shoes, goggles and a standard set of tools must be provided by each man. They also are required to follow such standard plans of doing their work as are set down by the company safety rules. These company rules have been made to provide the men the greatest protection possible in the pursuit of their duties.

Recoverable coal in the Eagle seam is 37,000,000 net tons and in Campbells Creek seam 35,000,000 net tons. At the estimated daily tonnage this property has a life of about forty years. It will be noticeable throughout the plant that it has been constructed with the effective life of each structure in mind. The plant buildings, housing and other construction have the appearance of durability and permanence.

Personnel at Kopperston includes: C. R. Bourland, superintendent; C. E. Dabney, mine foreman; J. C. Justice, chief electrician; A. P. Boxley, mining engineer; Jesse Redyard, safety inspector; H. G. Elam, mine accountant; Virgil Hensley, assistant mine foreman; W. D. Ward, supply clerk; and R. C. Walker, store manager.

STRIP COST HALVED

+ At Blue Bell "Cash and Carry" Mine Serving Northern Ohio Territory

COST of removing overburden at the 500-ton Blue Bell strip "cash-and-carry" mine near Dover, Ohio, has been cut in half by purchase and installation of tractors and scrapers operated by the coal company. Formerly contractors using power shovels did the stripping at 14c. per cubic yard. As the coal is dug and cleaned in the pits it is forked by hand into mine cars for transportation by gasoline locomotives to the tipple. The mine output is divided into two general grades according to crop, stain and quality, and each grade can be screened into four sizes. The tipple includes ten truck loading bins.

Blue Bell Coal Mines, Ltd., is owned and operated by T. L. Kane, an electrical engineer who spent some years in the teaching profession in Washington, D. C., and L. I. Klinger, whose former experience was principally in field superintendence for lumber and stone-quarry interests. They opened the Blue Bell mine in October, 1936, and have two more years' operation at that location. Usual sales during the busy season amount to 450 tons per day; however, for as much as a week at a time 500 tons per day has been sold for cash to truckers at the mine scale.

62 Miles From Cleveland

The location is two miles west on a township road that leads off the paved highway (U. S. No. 250) at a point 5 miles northwest of Dover. The mine is 19 miles from Massillon and 62 miles from Cleveland. Surface acreage secured for the mine was 250 and for the most part consisted of territory which, after low-recovery underground mining, had been abandoned as worked out or because of weak top.

The coal, reported as the No. 5 seam (Lower Kittanning), is 36 to 50 in. thick. It has a continuous 1-in. stone band 8 in. from the top and intermittent lenses of pyritic slate and bone 1 in. thick and 1 to 15 ft. long. These impurities require that the coal be hand-picked.

Forty prospect holes were drilled over the property with hand augers and supplemented with spuds where necessary, at a cost of about $5 per hole. Overburden ranges from a few feet to 100 ft. The typical cover being stripped consists of 6 ft. of clay and top soil and 20 ft. of fairly hard gray shale containing bands of hard "iron ore" at 4-ft. intervals. A scarifier is used where necessary for loosening the shale and "iron ore."

Shooting of overburden has been necessary in only one place about an acre in size where a hard limestone 6 to 48 in. thick tops the coal. It is drilled with jackhammers using Timken bits and is shot with 60-percent dynamite. Forty feet is the usual limit stripped with scrapers, but in one place on a hillside 70 ft. of cover was moved in order to provide access to other territory. The small areas of coal under cover exceeding 40 ft. will be mined by underground methods with access from the pits.

Principal items of stripping equipment are: two 95-hp. diesel RD-8 Caterpillar tractors; one 10-yd. Continental wagon scraper on rubber tires; one LeTourneau 12-yd. "Carryall," which is the 4-wheel wagon scraper on rubber tires; one LeTourneau "Rooter" weighted to 1 ton extra so it will scarify down to 2 ft. depth in hard shale; one LeTourneau "Angle-dozer" used for general purposes such as shearing vertical banks or walls, digging drainage ditches and leveling wagon scraper dumps that have become wavy; and one Allis-Chalmers type-LO diesel 80-hp. tractor with 7-yd. Continental wagon scraper on rubber tires.

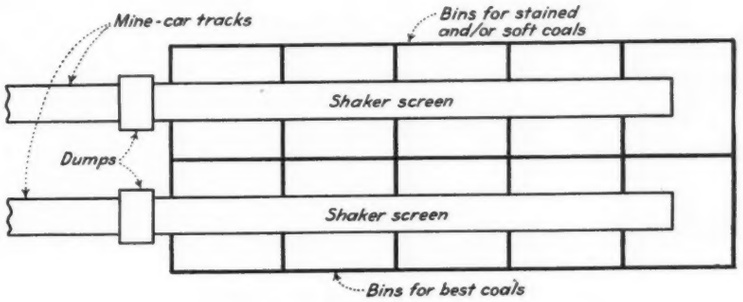
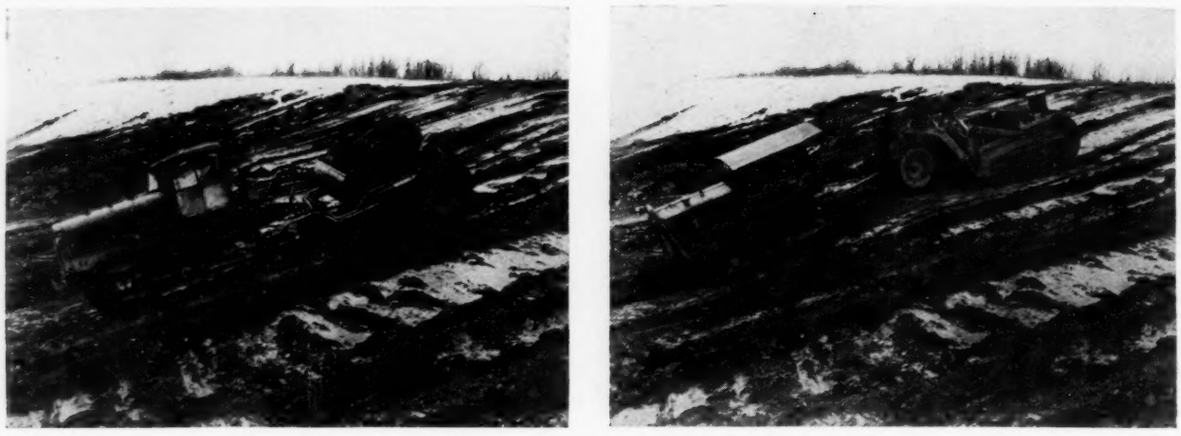


Fig. 1—Plan indicating arrangement of screens and bins.

Messrs. Kane and Klinger find a stripping layout which includes both types of scrapers an effective combination. The LeTourneau "Carryall" is used principally for removing top soil and clay and for cleaning off

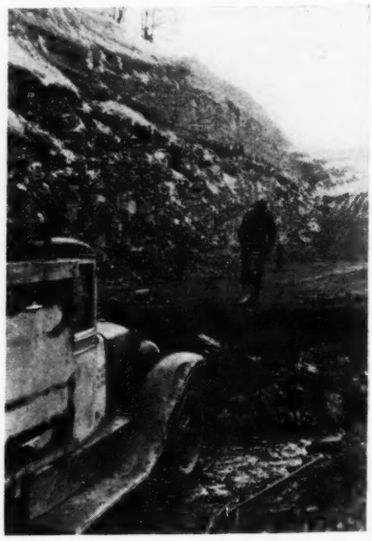


Left—The two-wheeled scrapers are capable of hard digging and can be back-dumped, thus extending the edge of a dump. Right—The four-wheeled 12-yd. scraper "is a bear for moving dirt."

the top of the coal, which job it does as well as men with brooms. Where back-dumping or hard digging is required, the Continental scrapers have the call. The crawlers originally on the Continental 10-yd. scraper have been discarded in favor of wheels equipped with Firestone 18.00-x24-in. Ground-Grip Earth-Mover tires because of the high maintenance on the crawlers.

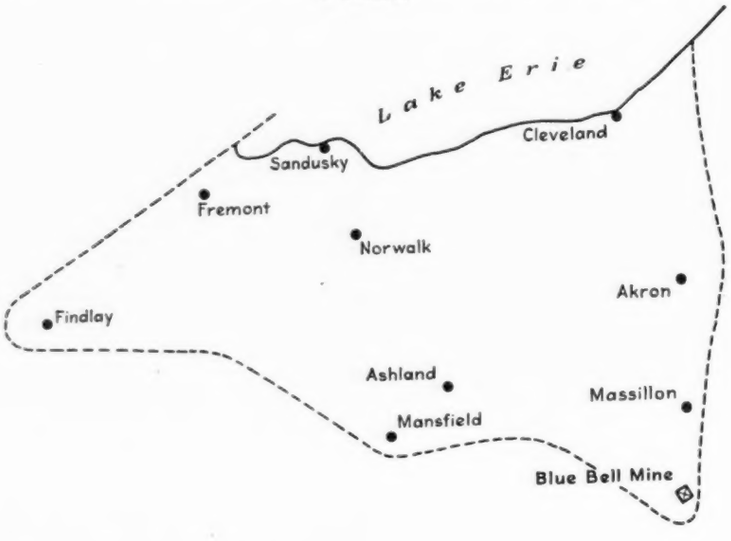
Contractors using shovels made cuts of about 60 ft. maximum width. In comparison, the scraper cuts have no absolute size limits and with them coal faces 250 ft. long have been provided. As a result, the coal comes out blockier on long faces, more mine cars can be spotted at a face, and a larger crew worked in one place. Moreover, with scraper stripping, say Blue Bell officials, loading of uncovered coal in certain areas can be delayed if necessary or desirable; the larger areas of uncovered coal permit more efficient use of wagon scrapers for cleaning the top; and the scraper method also allows leaving bare certain areas of fireclay bottom which it may be possible to market to near-by brick and tile plants.

In stripping, the tractors and scrapers operate three shifts per day in summer and two shifts in winter. The total mine requirement of diesel fuel, gasoline and other oils ranges from $1,000 to $1,200 per month. Life of wagon scraper blades was doubled by specifying that those purchased as replacements be faced with Stellite for ½ in. back on the top edge. These hard-surfaced blades wear to a sharp chisel edge instead of becoming rounded. Life of the ½-in. 6x19 wire ropes used in controlling the LeTourneau scraper was increased 400 per cent by changing from regular lay and plain to Langlay and preformed. Now the mine uses about 1,000 ft. of this rope in three months. As the long ropes of the LeTourneau wear or break, the good pieces are shifted to places using shorter lengths and to other and less important duties about the mine.



The 60-ft. of cover at the left was stripped with the scrapers.

Fig. 2—Territory outlined by the broken line is that into which the Blue Bell coal is trucked.



Emergency maintenance of the 2 miles of township road from tipple to paved highway falls to the coal company and a tractor with "Angle-dozer" is pressed into this service. Because this road is rather hilly it would become impassable to commercial trucks during snowy weather unless the coal company took action in self-protection. A certain amount

Left—Advantages are found in the longer faces that are made possible with scraper stripping. Right — Gasoline locomotive taking a loaded trip from the face.

of grading and cindering also is done.

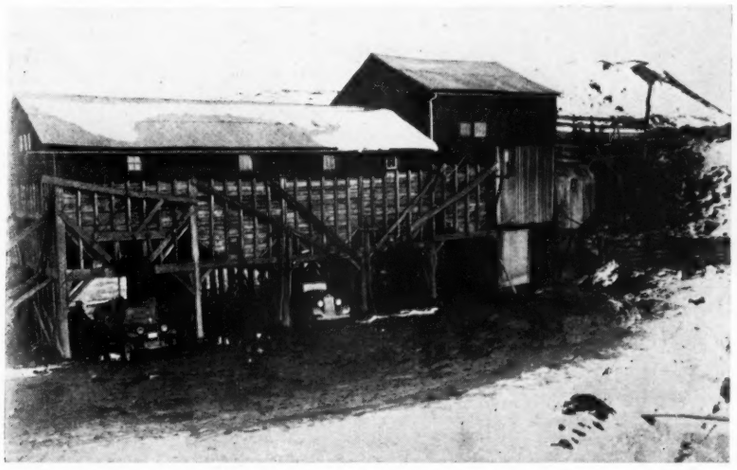
Thirty 1¼-ton plain-bearing 36-in.-gage mine cars, two Plymouth gasoline locomotives (one 6-ton and one 4-ton) comprise the face-to-tipple haulage equipment for three of six pits that are being worked at present. In three other pits, more remote from the track-haulage system and/or containing smaller areas of coal, the forked run-of-mine coal is loaded directly into customers' trucks. The company uses one or two motor trucks to haul clean-up and slack coal to the tipple and this usually is dumped on the side to which the crop-stained coal is diverted. The mine-car haulage tracks, of 16-lb. rail, are laid on the fireclay bottom.

Drilling equipment for coal and overburden consists of three jackhammers (one a spare) and two wheel-mounted gasoline-driven 110-c.f.m. compressors, one an Ingersoll-Rand and the other a Sullivan. These wheel-mounted compressors are carried on motor trucks and left thereon during the drilling. For coal shooting, the principal duty, 1-in. holes are drilled in a row positioned back from the face a distance equal to the coal thickness and spaced 3 to 4 ft. apart. Size FF black powder is used and it is ignited by cap and magneto. Coal-cleaning and loading crews work one shift per day. As indicated in Fig. 1, each of the two shaker screens extends over the tops of the five bins of its side and, in addition to screening, conveys the sizes to the bins. As a rule 3-in. lump is stored in two bins, 1¼x¾-in. stoker in one, 3x1¼-in. stove in another, and slack in the fifth. Except for the perforated plates and the eccentrics, the screens were built at the mine. Last year a new Scottdale double-roll crusher was purchased and installed with an elevator so that lump can be crushed if necessary to fill the demand for stoker coal.

Power for lighting and for the four 250-volt direct-current motors driving the screens, crusher and elevator is furnished by a 50-kw. generator driven by two (six- and eight-cylinder, respectively) Studebaker automobile engines. The drive connection—a flat belt—can be shifted to one engine or the other. This generating plant is housed in a building which serves also as a supply room and repair shop.

Sept. 15 to March 15 is the usual coal-selling season and except for the ⅜- and ¾-in. slack taken by industrial plants, the bulk of the coal goes to the domestic trade. Findlay, Ohio, 135 miles from the mine, is the usual limit of distance from which truckers come for the coal. As with other truck or "cash-and-carry" mines of northeastern Ohio, practically all of the coal produced moves northwest.

Five loading bins along each side of the tipple provide variety and quantity.



Notes . . . FROM ACROSS THE SEA

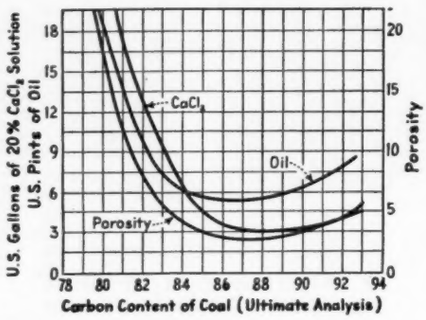
THOUGH their thermal efficiencies are only 30 to 32 per cent—a little below that of the diesel-oil engine—though they are less reliable than any other power producer, though excessive wear makes frequent repair necessary to important parts of the engines, and though their operation is subject therefore to frequent interruptions, engines which burn coal dust are to be manufactured by the Schichau-Werft at Elbing, according to the *Deutsche Bergwerks Zeitung*.

It will be a stationary slow-running unit operated for the production of electricity, designed, built and run on the diesel principle. It will use 3,600 to 3,780 B.t.u. per effective horsepower per hour—much less than present-day German turbine plants.

It appears that coal of normal ash content is to be used in the engine, despite the heavy wear occasioned, for it is feared that the cost of super coal would rob the coal-dust engine of its main advantage—low fuel cost. Piston rings, cylinder bushings, valves, etc., have all been redesigned to reduce wear. It is expected that the new engine will be used freely for railways and ships and will be exported to countries lacking in petroleum resources, for use not only with powdered coal but with powdered plant refuse of various kinds. Italians particularly are interested in its possibilities.

GREAT BRITAIN has begun to dustproof its coal, and Fuel Research in its annual report shows some remarkably smooth curves relating carbon content of coal per cent by ultimate (not proximate) analysis with fluid per ton of coal to give equal dustproofing effects using gallons of 20-per-cent calcium chloride and pints of oil per ton of coal. A curve also is shown relating porosity to carbon content. The relation between the curves for porosity and for fluid needed for effective dustproofing will appear more nearly in accord with each other if it be remembered that the relation between the two should be based on the distance between them as measured along a vertical ordinate, though almost inevitably judgment is rendered on the nearness of the lines as measured at right angles to them at the point of the curve being viewed. Where both curves are nearly vertical the lines may be quite close together on a horizontal or inclined line and yet far away measured along a vertical line.

Fuel Research says that "coals of less than about 83 per cent carbon content (on a dry ash-free basis) were not so suitable for commercial dustproofing as the coals of higher rank because a large proportion of oil was needed to impart the desired effect and because the initial effect of the oil tended to decrease with time, so that before long the coal again becomes dusty." In orientative comment, it may be said that 82.8 per cent on a dry ash-free basis is the proportion of carbon in the coal from the Montana mine of the Consolidation Coal Co., Marion County, West Virginia, which has a proximate analysis as received of 39.1 per cent volatile matter and 49.8 per cent fixed carbon. It has been found in the United States that in the porous low-carbon coals, the oil disappears rapidly by reason of absorption into the body of the lump or particle, but, if enough oil is added, sufficient oil remains on the outside to prevent dustiness for a long time. At last, of course, such oil evaporates.



Fluid per ton of coal to give equal dustproofing effects.

ABOUT the time the Chance washer with its sand-and-water medium made its appearance, a washer appeared also in which iron oxide with water was the suspension medium, but it made little progress. A little more fortunate has been the Tromp washer in Germany, which employs a suspension of finely ground magnetite in water, but sintered pyrite also has been used by Messrs. Humboldt. Pyrite is found in large quantities in the Reich, and it has a generous iron content which makes its sinter of high specific gravity, declares O. Schaefer, of Cologne, Germany, in the *Colliery Guardian*, of London, England.

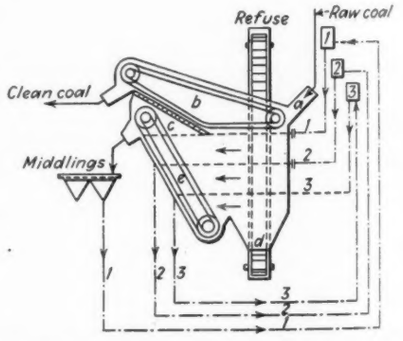
Not so pure as magnetite and therefore not quite so heavy, it nevertheless can be used with the Tromp washer. It has little metallurgic value because of the presence of zinc. The specific gravity of sintered pyrite is between 4.3 and 5, and that of commercial magnetite, 4.5 to 4.8.

Uniform density from top to bottom of the sustaining medium was at one time believed to be desirable in washing with heavy mediums, but in the Tromp process the density of the medium, while constant all over any level, varies consistently from level to level, being least at the top. Within reason, any difference in gravity between the top layer and the bottom can be obtained by varying the time the material is ground in the ball mill and therefore its fineness. However, according to the comments of C. W. Holmes, the density at the top can be lowered by 0.20 and the bottom density by 0.10 in 20 minutes without any alteration in the fineness of the heavy medium.

In the illustration, the raw coal enters on the right and drops into the bath. The clean coal promptly floats to the top, and as the scraper conveyor travels in its lower flight from right to left, it moves the medium in that direction and causes the clean coal to pass up the incline and to discharge from the snout marked "clean coal." Water is removed through the slotted screen *c*. However, the middlings and dirty coal or refuse descend in the medium until either they find a mixture in which they cannot sink or, finding none, drop to the bottom of the bath.

Lower portions of the medium, like its upper surface, would move slowly from right to left, but in a measure the speed would decrease rapidly with depth because the medium is so dense. To correct this stagnancy, some of the dense medium is taken off the discharged middlings and some is taken from two levels in the bath and circulated in pipes from left to right and up to small tanks, from which it can be gravitated back to the bath at the same level at which it was extracted. To avoid pumping such abrasive material, air lifts are used for this propulsion.

The heavy material or refuse falls almost vertically to the bottom, but the middlings, being more nearly of the specific gravity of the medium, fall more slowly and are driven sidewise for a long time by a more active current and so are carried further to the left, where the conveyor *e* lifts them up and drops them in the bins marked "middlings." Means are provided for mixing circulations 1 and 2 and 2 and 3 so that desired densities of separation of coal from middlings and of middlings from shale are obtained.



Washes coal by floating it in a medium consisting of water mixed with magnetite or with pyrite which has been sintered—that is, burned without melting.

A certain quantity of dense medium fine coal and clay slime is necessarily extracted with the three coarse products. Hence, they have to be sprayed so that the surfaces of the salable products will be bright, the magnetite or sintered pyrite will be recovered, and the fine coal and slimes will be removed from the system.

At the Domaniale mine, coal between ⅝ and 3¼ in. diameter is treated by the Tromp plant, but it also has cleaned coal between 5/16 and 3¼ in., all on a commercial scale. At Messrs. Humboldt's testing plant, particles as small as 1/12 in. can be separated in magnetite suspensions with the same accuracy as larger sizes. For the present, however, ¼ in. is assumed to be the lower limit, but undoubtedly the method would be successful with coal of flotation sizes, according to Dr. Schaefer.

Average washing results are excellent; the "clean coal" contains 99.5 per cent of coal of a density of 1.53 or less, the middle product about 95 per cent of coal of a density between 1.53 and 1.83, and the refuse 97 to 98 per cent of material with a density running above 1.83.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case are in the review notice.

Review of Literature on Conditioning Air for Advancement of Health and Safety in Mines—Part I, by D. Harrington and S. J. Davenport, U. S. Bureau of Mines. I. C. 7001, 38 pp.; mimeograph.

This bulletin assembles information as to the way in which the human body reacts to the organic matter, noxious and toxic gases and dusts with which air may be contaminated. Quoting W. K. Schroeder, it declares that digestive juices and foods decompose, forming fusel oil, fatty acids, aromatic acids, methane, hydrogen sulphide, amino-acids, cresol, indol and skatol, which are more or less toxic, but in later paragraphs the National Institute of Mines of Belgium is quoted to the effect that investigation showed that methane is merely inert, not poisonous. Explosives burned in presence of their own gases may form 35.9 per cent carbon monoxide and 48.2 per cent nitric acid. Men gassed with peroxide and other oxides of nitrogen produced by blasting may go home, wash, change, eat a meal, go to bed as usual—and die the next morning.

Determination of the Swelling Properties of Coal During the Coking Process, by H. S. Auvil and J. D. Davis, U. S. Bureau of Mines. R. I. 3403; 18 pp. and 10 full-page cuts; mimeograph.

Unless mixed with coals of higher volatile content, low-volatile coals swell excessively, breaking the walls of the ovens in which they are coked. This characteristic may vary with samples taken in different areas of the same seam in a single mine. An actual coking test of a large sample has been found to be the only way to ascertain the force with which any given coal will swell or shrink on carbonization. Hence, to make such tests, two types of small test ovens have been devised, one with a side wall and one with a roof plate, each adjustable with a screw so that the wall or roof plate can be kept in place despite increasing pressure. That pressure also is registered graphically or on a dial. The wall or roof plate may also be allowed to move so as to show the expansion or contraction of the coal in coking under any given pressure.

Percentage expansion of coal, when coking, varies inversely with the logarithm of the load under which the coal is coked where that load is maintained constant throughout the coking. Contractions of charge in the preplastic range and of coke are practically constant factors in any given coking coal. The expanding properties of a coal on coking are determined by its behavior while plastic.

Some Suggestions on Safety in Coal-Mine Haulage, by C. E. Herbert, U. S. Bureau of Mines. I. C. 6969; 18 pp.; mimeograph.

Almost all the hazards of haulage and hoisting are covered in this circular and it would be well if all safety men and managers would check their operations and practices by it. It should be possible to decrease mine-haulage accidents as much as railroad accidents have been decreased. The author advocates that, where tracks unite, the point where safe clearance between tracks ends be marked, so that cars left on one track will not be struck by locomotives or cars traveling on the other.

Annual Report of the Explosives Division, Fiscal Year 1937, by W. J. Huff, U. S. Bureau of Mines. R. I. 3383; 35 pp., with 14 page cuts; mimeograph.

Now that more gases are being found, or are likely to be found, in mines as a result of the use of oil for electric switches, lubrication, combustion engines and dustproofing, the Bureau's interest in the subject of gas ignition and combustion has greatly widened, and the work is being broadened so as to safeguard men in other industries. Recommendations with regard to the protection of men from the dangers incident to anti-dust treatment of coal with oil are given in this report. As carbon monoxide is an evidence of incipient combustion, tests have been made to ascertain, at various temperatures, the quantity of that gas liberated from coal and from the oil, timber and paper wastes in coal mines. Such wastes, as might be expected, liberate at relatively low temperatures more of this gas than anthracite, and even than sub-bituminous coal.

Researches have been made into the sensitizing effect of nitrogen peroxide on the explosion of hydrogen and oxygen, into the dry and water-catalyzed explosive reaction between carbon monoxide and oxygen and into the gases generated by diesel engines, especially by diesel locomotives, with the purpose of evaluating the hazard consequent on their use underground.

Low-Temperature Distillation Tests of Sub-bituminous Coal From the Denver Region Coal Field, Colorado, by W. H. Ode and W. A. Selvig, U. S. Bureau of Mines. R. I. 3342, 7 pp.; mimeograph.

This report gives the results of distillation of coals from the Highway and Puritan mines at 392, 662 and 932 deg. F., at which temperatures the carbonized residues respectively were about 57, 71 and 76 per cent of the coal as received.

Composition and Inflammability of Gaseous Distillation Products From Heated Anthracite, by G. S. Scott and G. W. Jones. U. S. Bureau of Mines. R. I. 3378, 6 pp. and 2 page cuts; mimeograph.

Below 662 deg. F. the gases from anthracite, heated out of contact with air, are mostly carbon dioxide, water vapor and carbon monoxide with little of the volatile matter. That last comes off rapidly at 1112 deg. F. Hydrogen percentages at 1472 to 1832 deg. F. ranged between 84.2 and 89.4 The authors believe that the presence of this light gas at high temperatures, with its disposition not to diffuse, explains why anthracite fires which have gained headway are so difficult to extinguish and burn so fiercely.

The Action of Hydrogen Upon Coal. Part III—The Development of a Small-Scale Liquid-Phase Continuous Plant, by N. Booth, F. A. Williams, J. G. King. Department of Scientific and Industrial Research, Fuel Research, T. P. No. 44. British Library of Information, New York. 27 pp., paper. Price, 30c.

This technical publication relates to experiments in the hydrogenation of coal as a liquid instead of a vapor in a 28-lb.-per-day apparatus. Ground coal of minus 72-mesh is mixed with a catalyst and both are then mixed with the vehicle which is either "hydroil" (oil from hydrogenation) or low-temperature tar. Together they are fed into a small converter with hydrogen, following which sludge and gases are obtained. Sludge, condensate, gas and loss resulting with three coals under different conditions are noted in this report, with the boiling points of the several fractions of oil obtained. Hydroil gives better results than tar. With the high-carbon coal, processing was difficult and conversion to oil low, though with higher pressures the results might have been bettered.

THIS WIRE ROPE NEVER HAD A CHANCE to give the full service of which it was actually capable. It was a victim of adverse working conditions. It was used on a sheave too small for its size and construction, and the high bending stresses imposed on the wires resulted in fatigue and premature failure. A condition of this kind (sheaves or drums too small) is both *unsafe* and *costly*.

In order to obtain the most economical service from wire rope, it is of vital importance that drum and sheave diameters are as large as possible.

Standard practice has established certain ratios for sheave and drum diameters for the various wire rope constructions, which are given in the following tables. All diameters are to be measured from bottom of groove.

It should be understood that diameters listed as "minimum" are not recommended. Sheaves and drums of recommended diameters, *or larger*, will give increased rope life—consequently, more economical service. Anything smaller than "minimum" is critical—for both efficiency and safety.

Rope Construction	Average Diameters Recommended	Minimum Diameters
6 x 37 Round Strand	27 times rope diam.	18 times rope diam.
8 x 19 Round Strand	31 " " "	21 " " "
6 x 19 Round Strand "Style B" Flattened Strand "Style G" Flattened Strand	45 " " "	30 " " "
6 x 7 Round Strand "Style D" Flattened Strand	72 " " "	42 " " "

This advertisement is published for the purpose of helping all wire rope users obtain safer and more economical service from their wire rope. We also publish a booklet "*Practical Information on the Use and Care of Wire Rope*," and we would be glad to send a complimentary copy to anyone interested.

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OPERATING IDEAS

From

Production, Electrical and Mechanical Men

Rooms-on-Short-Centers Plan Has Cash Value

"Rooms on short centers were vital to the eighteen years of operation of our several properties," states E. A. Smith, chief engineer of the Central Elkhorn Coal Co., Estill, Ky. This projection and system as adapted were intended for first mining only. All chain and room pillars were to be made thin, so thin that they would never have to be cleared of gob and mined out at an excessive expense for such a small tonnage as was recoverable from them.

The layout was made primarily for use along our many miles of outcrop, for areas having bad top conditions and for those lying under creeks and branches. It was later used, however, where partings of impurities became too thick to justify a second mining and for areas either too small or too narrow for a complete fall of the overburden even if all pillars were extracted. It was also used in sections where a uniform roof support was needed to protect the overlying and highly valuable coal seams, proper support being offered by uniform pillars with sizes adjusted in accordance with the varied weight of the overburden.

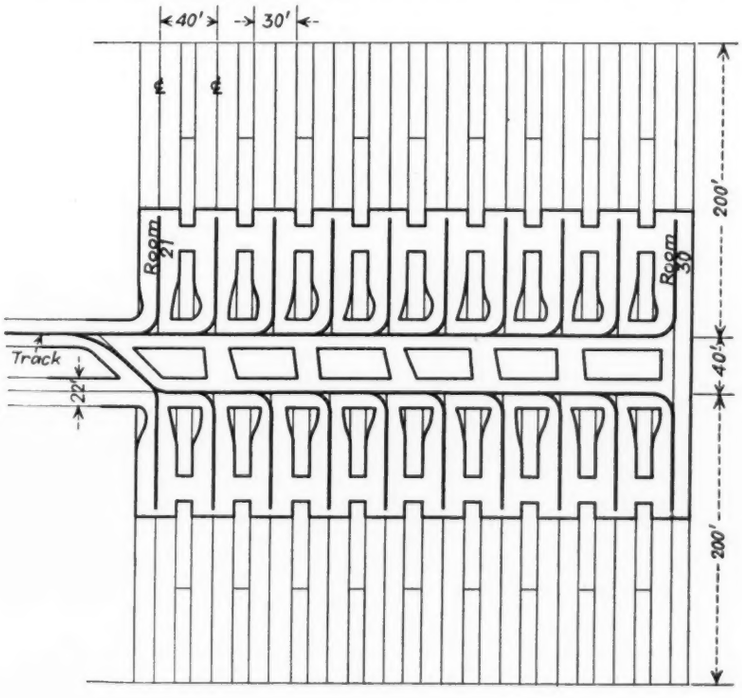
Larger openings provided for the air, gave greater freedom of flow and lessened fan resistance. A recovery of 72 per cent or better was made in many places and in sections which could not have been mined by any robbing system. Almost all timbering was recovered and used again and again. All track material was to be recovered. The danger to human life and limb was to be reduced to a minimum. We actually had only one fatal accident within such rooms and this was caused by a local rock fall from a malformation in top structure, and was not caused by carelessness in the use of the carefully planned system.

The extra width in most rooms gave a higher percentage of block coal, as more tons were produced per corner shot. Many rooms were duly turned on faces for thousands of tons in increased large-sized coal. Long lines of rooms were turned at will, resulting in a splendid concentration for a motor haul. A common center for operation was made possible by the double-entry system with rooms turned both ways, and this method was used wherever suited to the general scheme.

Concentration was infinitely more with this modern mining system than for most methods. When we say "rooms on short centers" we really think in terms of "concentration," which means to us lower cost for ventilation, maintenance, timbering, dewatering, track, wiring, bonding, road cleaning, handling fallen top, haulage, piping, yardage and supervision.

The difference in cost of our coal production from robbing sections and that from rooms was around 5c. per ton in favor of the room coal, to say nothing of the loss of block sizes usually incurred in the extraction of pillars. Since we have mined to date some 2,000,000 tons of coal from rooms on short centers, it is conservative to estimate our plan worth $100,000 in cash on the cost of production alone.

Production per man-shift, 10 tons; output per shift from double entry, 200 tons.



Band Rolled and Then Clamped Improves Tire Welding

Forming the tire band into a true circle by use of a roller-type wagon tire former, followed by turning up the ends to accommodate a C-clamp for tightening the band onto the tire preparatory to welding, are the essentials in the locomotive tire-filling practice at the central shop of the Lillybrook Coal Co., Lillybrook, W. Va. Questioned regarding the general features of tire welding, J. W. Ailstock, general superintendent, replied that for more than four years practically all worn tires at Lillybrook have been rebuilt by arc-welding and the cost of a filling job is one-half the cost of buying a new tire.

The welding is done by hand, using

power from a "Shield-Arc" machine rated at 400 amp. but capable of supplying 600 amp. Steel strip ½x1¼ in. in section and containing 0.60 carbon is first rolled to a circle in a wagon-tire bender as illustrated in Fig. 1. Next the ends are heated and turned up to the position that may be observed in the completed bands shown in Figs. 1 and 2. With a gas torch a shallow depression is cut on the turned-up part to receive the end of the ¾-in. setscrew of the clamp, thus preventing slipping. The band is not heated when clamped onto the tire.

Before applying the band the tread of the tire is turned in a lathe to present a smooth seat. That feature, plus getting the band tight and applying the first-layer weld so as to thoroughly fuse the lower corners of the band section to the tire, are looked upon as the "secrets" in holding the band so that it will not peel off before the tire is worn to the practical limit. Electrodes 3/16 in. in diameter are used for this bottom-layer welding, which is completed with one revolution of the wheel. One electrode rod at a time is applied alternately to each side of the band.

Fig. 1—Hunter Richmond, welder, demonstrates how he bends the tire filler bands.

Next the clamp is removed and the projecting ends of the band, heated with a gas torch and hammered down, are then welded. The second and last layer of welding also is done in one revolution and in the same side-to-side fashion but using ¼-in. electrodes. Both sizes of rod are the uncoated type and contain 0.40 per cent carbon. Smoothing the welds in a lathe is the final step.

Some years ago filling the tire with fused metal only was tried at Lillybrook. In that case a ⅜-in. electrode and 600 amp. were used and the same ½x1¼-in. high-carbon steel was fed into the electrode arc, a practice still followed at some mines (*Coal Age*, September, 1938, p. 52). Difficulty due to breakage of tires was the principal reason for abandoning the ⅜-in. practice at Lillybrook. Annealing by starting the heating while the tire was still hot from rapid and uninterrupted welding was not tried, however.

Even with the present band-weld method used at Lillybrook, tire breakage does occur once in a while, but this breakage is almost sure to happen before the tire is put into service. Once into service the peening effect of travel on the rails relieves internal strain to some extent. Tires with undue shrinkage allowance which grip the wheel center with excessive tension are thought to be the ones which break. Breakage amounts to only two or three tires out of an estimated 200 welded per year. This slight breakage, however, has been sufficient to cause the management to continue to buy new tires for a 13-ton locomotive which operates on a high-speed

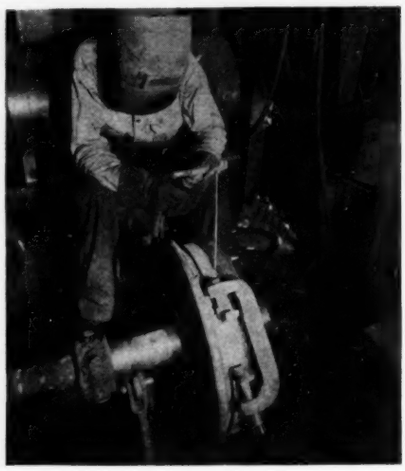


Fig. 2—Ready to start the bottom weld after the band has been tightened with the clamp.

haul and is the one exception to the general welding practice at Lillybrook.

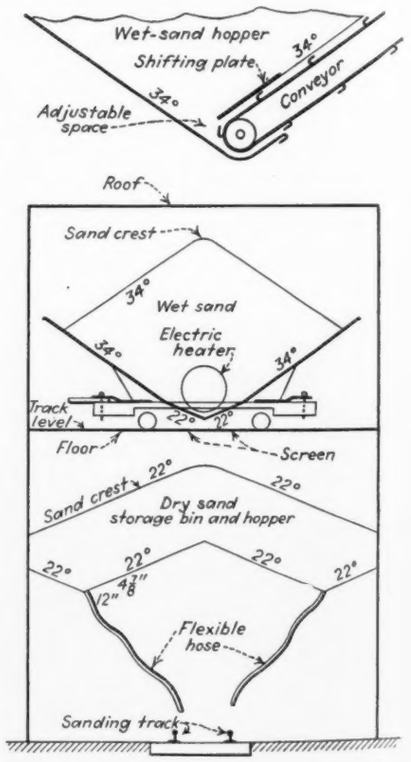
The few tires which have broken have been repaired as follows: The break is veed with a gas torch and lugs are welded to the tread to accommodate a clamping bolt. After being heated to an estimated 300 deg. F. the tire is applied and tightened onto the center by the clamping bolt. After the V has been arc-welded the lugs are cut off and the weld is trimmed in the lathe.

Economies in Sand Drying May Be Considerable

Even the lowly task of sand drying may offer an opportunity for decided economies, contends E. A. Smith, chief engineer, Central Elkhorn Coal Co., Estill, Ky., in presenting a few ideas that might be considered. A very-low-voltage electric heating unit, he opines, might be a forward stride. Possibly a.c. might be used to good advantage in many cases. Some such heat unit might be employed night and day in the interests of economy, thus keeping the dry-sand utility bin filled beyond day-to-day demands.

Many sand houses are too high and are built of a most inflammable material. Sand is hoisted too high in many cases, with resultant undue energy cost, and little has been done in promoting efficiency in conveying and drying of sand. Electric heating, as pointed out above, may be the answer to the latter problem, while the accompanying sketches show two approaches to the problem of elevating wet sand as well as filling locomotive sand boxes by flexible hoses from a utility dry-sand hopper.

Angles of repose, as shown, always should be considered, Mr. Smith contends.



Bottom, utility dry-sand hopper with flexible filling hoses, over which is a combination wet-sand car, hopper and dryer. At the top is illustrated a second method of handling wet sand: i.e., elevating it by means of a conveyor.

Full Blast

• Mining operations, if the desired low cost is to be achieved, must go forward full blast. Small difficulties which slow down large machines, for example, exact a heavy penalty in lost tonnage, while injuries disrupt any operating system, no matter how well planned. So operating, electrical, mechanical and safety men must keep on their toes. To help them do so, Coal Age maintains this Operating Ideas department, and solicits your help in making it of the greatest possible service to all mining men. If you have sweat out the answer to a troublesome problem, send it in to us, along with a sketch or photograph if it will help to make your explanation clearer. We want such material and we pay $5 or more for each item that we find acceptable.

Visit Exide Booth No. 114
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EXIDE-IRONCLAD . . . the key to higher production per day . . .

Faster haulage, more continuous service, more consistent ability to keep coal moving from face to tipple without delay—these are some of the advantages you gain by using Exide-Ironclad Batteries.

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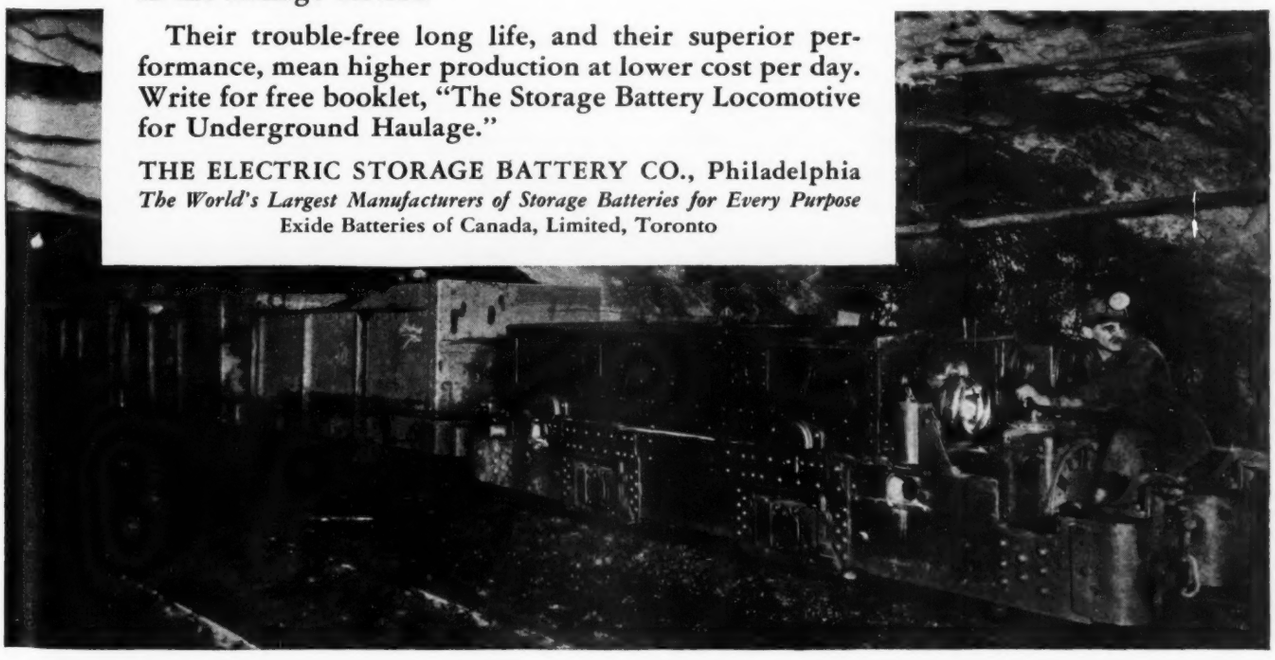

These angles may be obtained from the "Tabulated Buying Data," in the "Keystone Coal Mining Catalogs," which also give the weight of both dry and wet sand per cubic foot. It will be found that 15.4 cu.ft. of space is required for a ton of wet, packed sand and 20 cu.ft. for the same weight of dry, loose sand. By proper use of these figures, the bin space necessary can be determined accurately.

"The 'clever' use of the information given should aid in reducing the height sand is being hoisted; should avoid the use of fuel and at the same time the fire hazard; should reduce the cost of 35 man-hours per week to a mere charge for electricity for the same period at the mine rate; should encourage the building of fireproof sand houses and finally should prove a means of ending losses in working time growing out of undue delays to locomotives at sand-filling stations."

Night Blindness and Vitamin A Deficiency In Relation to Safety and Efficiency

By DR. J. F. NEUMUELLER
Director, Bureau of Visual Science
American Optical Co.

NIGHT BLINDNESS is the difficulty, and occasionally inability, to adapt the faculty of vision to very faint illumination. It is accompanied by inability to recover vision rapidly after exposure to brilliant light. Everybody has experienced the sensation of being unable to see well for a brief time after walking from a brightly lighted theater lobby into a dimly lit movie house. Some people require a much longer time to adjust their vision to the darkness than do others. This may be a sign of night blindness.

Let's consider a concrete example. A night-blind person meeting a glaring headlight on the road is blinded many times longer than a normal man. At 40 miles an hour, his car may go from 40 to 100 ft. before his eyes readjust themselves to the darkness sufficiently for him to see a pedestrian on the roadside, or an obstacle. Hence, accidents may occur.

Night blindness is a recognized symptom of various diseases, not only of the eye but of the entire human system. In addition, it also is a symptom of a vitamin A deficiency. And vitamin A is universally recognized as important in nutrition and dietary requirements.

In other words, night blindness and a vitamin A deficiency should be recognized as highly important factors in respect to safety and also industrial efficiency. It is perfectly true that dark adaptation studies, as they are called, are still in their infancy in industry. However, in the opinion of this commentator, it is only a matter of time until such studies will be part and parcel of safety directors and production men generally.

An interesting example tends to prove this assertion. Drs. R. C. Wise and O. H. Schettler, reporting in a recent issue of the *Ohio State Medical Journal*, state that the efficiency of color matchers in the Westinghouse Electric & Manufacturing Co. was increased 75 per cent by feeding those deficient in vitamin A, capsules containing carotene-in-oil, a specific used in the prevention and cure of nutritional night blindness. In addition, the workers reported much more eye comfort and in many instances improvement in general health.

Obviously, an accurate scientific test for night blindness is essential as a means of determining the presence of the visual defect in anyone whose work involves the safety of himself and others, when that safety depends upon his seeing well in dim illumination.

The principle of a night-blindness test is based on the physiologic changes occurring in the eyes of a person when exposed to a brilliant light and later subjected to faint illumination. In the eye is a substance known as visual purple which is necessary for seeing. Severe exposure to glare bleaches out the visual purple, producing the temporary blindness that we experience when facing dazzling headlight glare.

Our bodies can restore the visual purple to normal through the agency of vitamin A. If we have enough of that vitamin in our bodies, the vision is soon brought back to normal. However, persons deficient in vitamin A, or suffering from certain diseases or their after-effects, cannot regenerate visual purple as fast as normal people and may be night blind.

Adaptometer used to detect night blindness.

Unless specifically searched for, night blindness can be easily overlooked or dismissed. Recently, a new test was made available which provides, perhaps, the quickest and easiest method of determining the defect. The test requires only a few minutes; the technique is simple and easily learned.

The subject is seated before an instrument called the Adaptometer in a dark room, and for a period of three minutes he looks directly into a light of controlled intensity which bleaches out the visual purple of the eye necessary for scotopic or night vision. At the end of a three-minute period, measured by a stop watch, the exposure light is turned off and a light of much lower intensity is substituted. The period of time required for the subject to see the light of lower intensity is the basis for measuring the extent of night blindness present.

Studies of thousands of cases in which night blindness was a correlated condition showed that an individual with normal dark adaptation to darkness will see the dim threshold light within five minutes from the time the exposure period ends. If a longer time is needed, the subject is considered to have night blindness. A thorough eye and physical examination should then be recommended to ascertain the cause of the night blindness.

The value of such a test in the coal-mining industry is obvious. As a matter of fact, wherever an individual is alternately exposed, in his work, to glaring light and low illumination, or where his ability to see well at night or in darkness may involve either his personal safety or the safety of others, a periodical check of that individual's dark adaptation is an essential precaution for safety.

In addition, a test for night blindness —a possible indicator of vitamin A deficiency—should help to increase industrial efficiency. Doctors charged with general health work in industries will find such a test helpful in checking vitamin A contents of the body. From a coldly practical point of view, such a test undoubtedly will aid in safeguarding the employee's health and welfare, and as a corollary increase his efficiency.

Incidentally, night blindness due to nutritional deficiencies is sometimes quickly remedied by a diet of natural foods such as dairy products, green vegetables, carrots, etc., or intensive doses of vitamin A. There is at present no known cure for night blindness caused by certain organic diseases.

Cleats Avoid Costly Changes In Screen Incline

In many cases it is found that coal will pass over a screening surface without being properly screened or sized by that section. It also is common knowledge that to flatten the angle of inclination of such a plate would give the desired results, but to make such a change would run into complications of a mechanical nature and expense, states

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This new vapor oil has a greater spreading or creeping tendency. It covers the coal thoroughly and seals it against the alternate moisture absorbing and drying action present in untreated coal. With moisture sealed in and oxygen kept out, *degradation* and *breakage* are greatly reduced. In addition, the high viscosity of Standard Vapor Oil makes it cling to the coal longer, giving more lasting protection.

Let a Standard Lubrication Engineer describe the further advantages of coal spraying and suggest methods of application to fit your particular job. Write Standard Oil Company (Indiana) 910 South Michigan Avenue, Chicago, Illinois.

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STANDARD OIL COMPANY (INDIANA)

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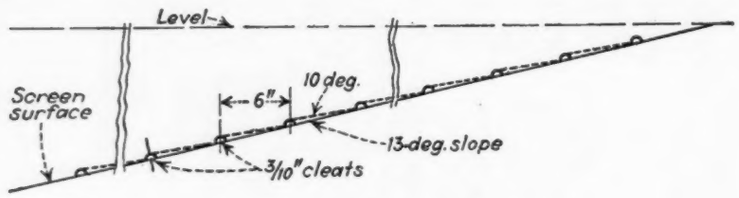


Cleats used to improve screening.

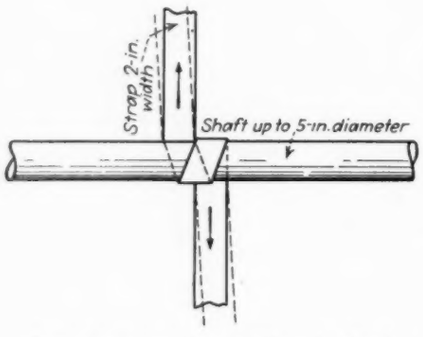
E. A. Smith, chief engineer, Central Elkhorn Coal Co., Estill, Ky.

In case it is desired to change the screening angle by means of cleats from, say, 13 to 10 deg., the placing of 3/10-in. high cleats, spaced 6 in. apart by horizontal measure, would give the desired result. Other changes can be made with respect to degree of slope by taking the difference in the natural tangent of the two angles considered and multiplying that difference in tangent by the desired spacing in inches. This will give the height or thickness of required cleat in inches.

This simple use of metal cleats placed across a screening surface retards the flow of coal, or other material, and thus results in a better preparation. It is an easy matter to lessen the angle of inclination of the actual flow plane of coal to a smaller degree of tilt by means of these cleats, thus saving expensive changes and a possible loss of running time.

Refinishing Scored Shafting By Hand Method

Removing scores from shafting by hand power, without the inconvenience of transfer to a lathe for re-turning, is being successfully accomplished by John Gross, chief engineer, No. 6 Coal Co., New Philadelphia, Ohio. Using sandpaper or emery cloth resting inside and kept in contact with the shaft by a flexible strap completely looped around the abrasive and the shaft, two men alternate in pulling the strap, in tension, much as two men use a hand saw in cutting timber. The length of the strap is from 4 to 5 ft. and the width about 2 in.



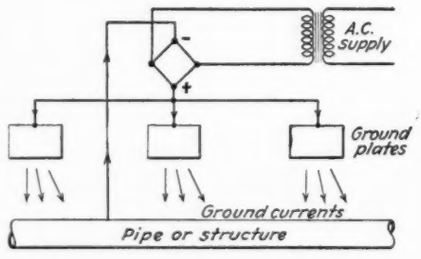
Removing scores from shafting by hand.

With the emery cloth or sandpaper gripping the shaft and being rapidly turned by the looped strap, the scored portion is traversed by pulling slightly to the right and to the left. Scored shafts up to 5 in. in diameter are treated by this method.

Copper-Oxide Rectifiers Used To Protect Pipe Lines

Recently at a certain mine in the Midwest, corrosion quickly destroyed a trench-buried steel pipe which carried water from a deep-well turbine pump to the mine plant. Acidity of the surface soil was blamed and the steel pipe was replaced with one made of non-metallic materials. That electrolysis was the primary cause and that it could have been prevented by use of a copper-oxide rectifier is the thought that came to a *Coal Age* editor as he read a paper, "Application of Copper-Oxide Rectifiers," in the March, 1939, issue of *Electrical Engineering*, published by the American Institute of Electrical Engineers.

Quoting from the paper, which was written by E. W. Morris, engineer, Westinghouse Electric & Manufacturing Co., and which was read at the A.I.E.E. Pacific Coast convention, Portland, Ore., August, 1938, light is thrown upon a problem to which coal mining is susceptible because of the extensive use of direct current:



Cathodic protection against electrolysis.

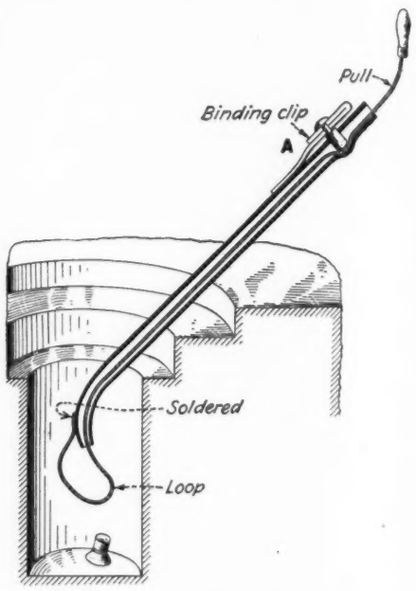
"Corrosion of underground structures can be mitigated by the use of cathodic protection and is conveniently accomplished by connecting the underground structure to the negative terminal of a d.c. source and maintaining it negative to the earth by 0.3 volt or greater. Corrosion occurs in underground structures due to stray currents from d.c. systems and from electrochemical reactions between the structure and surrounding soil. Small currents flow from the underground structure through the soil to other parts of the structure, corrosion occurring where the currents leave the structure."

After referring to a photograph of an outdoor installation of a 30-amp. 10-volt rectifier protecting a pipe line from corrosion the paper continues: "The use of the copper-oxide rectifier for this d.c. supply is preferred to other d.c. sources because of its efficiency at low voltages and the fact that a minimum of maintenance is required, such as an occasional check of the output to adjust for seasonal variations in the soil. The device is noiseless and free from radio maintenance, factors which are important when the device must be located in residential districts."

The accompanying sketch is a copy of a schematic diagram which the author of the paper submitted to indicate the use of the device to protect a pipe line.

Long Reach Pick-Up

A design for a handy long-reach pick-up that will be found easy to make and very useful to snare any small part that drops into the depths of a machine being overhauled is shown in the accompanying sketch submitted by Charles H. Willey, Penacook, N. H. The tool is made from a length of tubing and a piece of wire mounted on a handle. The wire is secured to the outside of the tube at the pick-up end and is fitted with a handle at the other end. A hole is drilled in the tube near the lower end at *A* and a depression made opposite. A spring grip with a binding pin attached serves to clamp the wire after the part is snared. The tool can be manipulated with one hand.



Handy tool for snaring small parts dropped into differential cases or inaccessible parts of machines.

WORD FROM THE FIELD

Clark Bill Would Stiffen Curb on Pollution

A more stringent substitute for Senator Barkley's anti-stream pollution bill was introduced in the Senate at Washington on March 3 by Senator Bennett C. Clark of Missouri. The later measure provides for setting up a division of water-pollution control in the Army Engineers Corps, rather than in the Public Health Service, and for the enforcement, under certain circumstances, of positive control against pollutors.

The Clark bill also provides for the establishment of sanitary districts taking in the navigable waters of the continental United States, the setting up of standards of water purity for each district, and the promulgation of regulations governing the discharge of wastes therein. In each district there would be set up a board of from 5 to 21 members, including representatives of State health and conservation boards, municipalities, industry, and labor. Each board would work for pollution abatement, both through the enlistment of voluntary cooperation and, if necessary, through court proceedings. The measure also proposes investigation of the desirability of increasing federal loans and grants-in-aid up to 50 per cent of the cost of projects.

The fate of the Clark bill will be decided on the floor of the Senate when the Barkley bill is called up for consideration, since the Commerce Committee, of which Senator Clark is a member, has already reported the Barkley measure favorably. The Clark bill must be voted upon as an amendment proposed as a substitute.

Battle Urges States' Rights

John D. Battle, executive secretary of the National Coal Association, urged the House Rivers and Harbors Committee of the House on March 3 "to consider most carefully the effect on industry of this type of legislation and keep it local; keep it out of bureaucratic control from Washington. Let's recognize the States and their right to conduct their affairs. Let the Federal Government assist by study, suggestions and recommendations, but not by any authority to order."

Speaking for the American Mining Congress, J. D. Conover, secretary, told the Committee he favored the principle of scientific studies by the proper agencies of the Federal Government, in cooperation with the local governments and with industries to assist in minimizing pollution. The Mining Congress, he said, was opposed to the "force" type of law with drastic regulation and control of "these local problems."

Formation of a Potomac Valley Conservancy District for abatement of pollution in the watershed of the Potomac River was agreed upon by 35 representatives of the states of Virginia, Maryland, West Virginia, Pennsylvania and the District of Columbia at a meeting held March 6 in Washington. Terms of an interstate compact approved at the conference provide for a permanent body consisting of three representatives from each of the jurisdictions named, together with three to be appointed by the President. A budget of $12,000 was approved for the first year of operation, with provision for increasing this in subsequent years to a maximum of $30,000. Territory under the supervision of the Conservancy District comprises 14,176 square miles with a population of 1,500,000.

Keeping Step With Coal Demand

Bituminous Production

Week Ended	1939 (1,000 Tons)	1938* (1,000 Tons)
February 4	8,075	7,709
February 11	8,600	6,866
February 18	8,510	6,633
February 25	8,570	6,491
March 4	8,442	6,405
March 11	8,000	6,439
Total to March 11	82,538	69,370
Month of February	**33,910**	**27,440**

Anthracite Production

February 4	1,208	1,129
February 11	1,106	845
February 18	854	772
February 25	973	864
March 4	915	1,051
March 11	769	1,102
Total to March 11	10,315	10,213
Month of February	**4,111**	**3,539**

* Outputs of these two columns are for the weeks corresponding to those in 1939, although these weeks do not necessarily end on the same dates.

Bituminous Coal Stocks

	(Thousands of Net Tons) Feb. 1, 1939	Jan. 1, 1939	Feb. 1, 1938
Electric power utilities	8,594	8,491	8,960
Byproduct coke ovens	7,897	7,462	6,469
Steel and rolling mills	742	687	1,050
Railroads (Class 1)	5,813	5,629	6,519
Other industrials*	10,975	11,401	12,169
Total	34,021	33,670	35,167

Bituminous Coal Consumption

	(Thousands of Net Tons) Jan. 1939	Dec. 1938	Jan. 1938
Electric power utilities	3,600	3,684	3,377
Byproduct coke ovens	4,751	4,742	3,923
Steel and rolling mills	858	837	789
Railroads (Class 1)	7,149	7,161	7,107
Other industrials*	9,920	10,109	10,167
Total	26,278	26,533	25,363

* Includes coal-gas retorts and cement mills.

Cincinnati Exhibit Feature Nears the Top

Exhibition of equipment in connection with the Sixteenth Annual Coal Convention and Exposition to be held under the auspices of the Coal Division of the American Mining Congress at Music Hall, Cincinnati, Ohio, April 24-28, bids fair to exceed previous records with 149 exhibitors already having contracted for space. The list of exhibitors as of March 20 included:

Acme Compressor Co.
Advertising Displays, Inc.
Ahlberg Bearing Corporation
Air Reduction Sales Co.
Louis Allis Co.
Allis-Chalmers Mfg. Co.
American Blower Corporation
American Brattice Cloth Corporation
American Car & Foundry Co.
American Cyanamid & Chemical Corporation
American Chain & Cable Co., Inc.
American Steel & Wire Co.
American Wire & Cable Co.
Atlas Powder Co.

Barber-Greene Co.
Bemis Bros. Bag Co.
Bethlehem Steel Co., Inc.
Bituminous Coal Research, Inc.
Bowdil Co.
Broderick & Bascom Rope Co.
Brown-Fayro Co.
Bucyrus-Erie Co.

Cardox Corporation
Carnegie-Illinois Steel Corporation
Central Electric Repair Co.
Chicago Pneumatic Tool Co.
Cincinnati Mine Machinery Co.
Cities Service Oil Co.
Coal Mine Equipment Sales Co.
Coffing Hoist Co.
Columbia Steel Co.
Crucible Electric Steel Co.
Cyclone Fence Co.

Deister Concentrator Co.
Deister Machine Co.
Deming Co.
Differential Steel Car Co.
Douglas Guardian Warehouse Corporation
Duff-Norton Mfg. Co.
E. I. duPont de Nemours & Co., Inc.
Dustlix Corporation

Thomas A. Edison, Inc.
Electric Controller & Mfg. Co.
Electric Railway Equipment Co.
Electric Storage Battery Co.
Enterprise Wheel & Car Corporation

Fafnir Bearing Co.
Fairmont Machinery Co.
J. H. Fletcher & Co.
Flood City Brass & Electric Co.

General Electric Co.
Gibraltar Equipment & Mfg. Co.
Goodman Mfg. Co.
Gould Storage Battery Co.
Gruendler Crusher & Pulverizer Co.
Gulf Oil Corporation
Gurgan Machinery Co.

Haynes Stellite Co.
Hendrick Mfg. Co.
Hercules Powder Co.
Hobart Brothers Co.

Imperial Bronze Mfg. Co.
Interstate Equipment Corporation Co.
I-T-E Circuit Breaker Co.

Jeffrey Mfg. Co.
Johnson-March Corporation
Joy Manufacturing Co.

Koehler Mfg. Co., Inc.
Koppers Co.
Koppers-Rheolaveur Co.

La-Del Conveyor & Mfg. Co.
Leschen, A., & Sons Rope Co.
Linde Air Products Co.
Link-Belt Co.

Macwhyte Co.
Manchas Storage Battery Locomotive Co.
Marion Steam Shovel Co.
McGraw-Hill Publishing Co.
McLanahan & Stone Corporation
McNally-Pittsburg Mfg. Corporation
Mechanization, Inc.
Metal & Thermit Corporation
Mine Safety Appliance Co.
Morrow Mfg. Co.
Mott Core Drilling Co.
Myers-Whaley Co.

Nachod & United States Signal Co.
Nail City Bronze Co.
National Carbide Corporation
National Carbon Co., Inc.
National Electric Coil Co.
National Malleable & Steel Castings Co.
National Tube Co.
Nordberg Mfg. Co.
Norma-Hoffmann Bearings Corporation

Ohio Brass Co.
Osmose Wood Preserving Co. of America, Inc.
Owens-Corning Fiberglass Co.

Penn Machine Co.
Pennsylvania Electric Coil Corporation
Philco Radio & Television Corporation
Portable Lamp & Equipment Co.
Post-Glover Electric Co.
Productive Equipment Corporation
Frank Prox Co., Inc.
Pure Oil Co.

Roberts & Schaefer Co.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Rome Cable Corporation

Safety First Suppy Co.
St. Louis Power Shovel Co.
Sanford-Day Iron Works, Inc.
Scully Steel Products Co.
Shell Petroleum Corporation
Simplicity Engineering Co.
S K F Industries, Inc.
Socony-Vacuum Oil Co., Inc.
Standard Oil Co. (Indiana)
Stephens-Adamson Mfg. Co.
Sterling Pump Corporation
Streeter-Amet Co.
Sullivan Machinery Co.
Sun Oil Co.

W. O. & M. W. Talcott, Inc.
Tallman Mfg. Co.
Tamping Bag Co.
Templeton, Kenly & Co.
Tennessee Coal, Iron & Railroad Co.
Tide Water Associated Oil Co.
Timken Roller Bearing Co.
Tool Steel Gear & Pinion Co.
W. S. Tyler Co.

Union Carbide & Carbon Corporation
Union Wire Rope Corporation
United Engineers & Constructors, Inc.
United States Bureau of Mines
United States Rubber Co.
United States Steel Corporation

Watt Car & Wheel Co.
Webster Mfg. Co.
Weir Kilby Corporation
Western Cartridge Co.
Westinghouse Electric & Mfg. Co.
West Virginia Rail Co.
H. Kirk White & Co., Inc.
Wilson Welder & Metals Co.
Wood Preserving Corporation

The program of the technical sessions will be found on pp. 66 and 67.

To Abandon New Baden Mine

The New Baden (Ill.) mine of the Southern Coal, Coke & Mining Co. is to be abandoned. Judge Fred L. Wham, of Federal District Court, at East St. Louis, Ill., granted permission to this effect on March 6, on petition by R. W. Gass, trustee. The company is in process of reorganization. The mine is about 40 years old and once employed nearly 500 men.

New Bill Would Revoke Price Fixing; Commission Faces Further Delay

WASHINGTON, D. C., March 21—A bill to amend the Guffey-Vinson coal control act so as to eliminate the National Bituminous Coal Commission's price-fixing power was introduced in the House yesterday by Representative Robert G. Allen (D.) of Pennsylvania. Indorsed by the Committee for Amendment of the Coal Act, the new measure would give the industry the right to regulate prices itself, subject to approval of the Commission, in the manner that the Interstate Commerce Commission regulates railroad rates.

The bill also provides for (1) reduction of the Commission to three members; (2) abolition of the 1c. per ton tax; (3) guarantee of collective bargaining to the miners and prohibiting the government from buying coal from operators denying the privilege to employees; (4) elimination of district boards, code membership, minimum price areas, and the establishment and coordination of prices, rules and regulations; (5) abolition of the 30-day restrictive contract clause. The measure applies to lignite as well as bituminous coal.

In orders issued today the Commission declared that all district boards except Nos. 5, 14, 16, 18, 20 and 23 had failed to coordinate prices, and that all except Nos. 14, 16, 18, 20 and 23 had failed to coordinate rules and regulations. Thereupon it stated that it would proceed itself to coordinate such prices and rules. Another order directed district boards to meet to act upon reports of their coordinating representatives, to boards to report to the Commission not later than April 10 with underlying data. A fourth order directed boards to propose price classifications for coal of code members for which no price classification had hitherto been proposed.

Final Hearing Deferred

As if the obstacles already encountered by the Commission in setting minimum prices were not enough, it faced the likelihood of further delay with the adjournment to March 27 of its final cost hearing. The postponement came about through omission by the Commission of the words "final hearing" in its order for the hearing which began here on March 6. Counsel for the Carter Coal Co. stated that he understood this to be a resumed "informatory" hearing and that he was not prepared for a "final" hearing. Therefore Chairman Tetlow adjourned the sessions to give all interests full opportunity for protection of their rights.

When the Commission set March 27 as the date for the opening of the final hearing to determine minimum prices, Chairman John A. Howe of the Committee for Amendment of the Coal Act declared that to determine weighted average costs for so intricate an industry as coal is almost an impossible task. Terminating the informative hearing and starting a new and final hearing twenty days later, he said, "means that every bit of evidence on which costs are to be determined will have to be introduced in the new hearing, and that the preliminary informative evidence introduced at the earlier hearing will, to the extent it is deemed necessary as a basis for costs, have to be resubmitted if any minimum prices which may be eventually fixed are not to meet the same fate as the abortive prices issued in November, 1937."

The movement to amend or repeal the coal act is premature and "not for the best interests of the industry," according to C. E. Bockus, president, Clinchfield Coal Corporation. In reply to a questionnaire by the Howe committee, Mr. Bockus said; "My suggestion is to give the act a fair test in actual operation so soon as minimum prices are established. No one expects perfection, and mistakes can be corrected by the process of trial and error. I believe the Commission is entirely fair and sincere in a desire to do justice to all. If there is honest cooperation on the part of the industry, it will be of the greatest assistance."

Would Retain 1c. Tax

In regard to the 1c. tax, Mr. Bockus observed: "I presume all operators would like the tax abolished, and there are a lot of other taxes that might be abolished that bear much more heavily on the industry. If the existing tax is necessary for the future enforcement of the penalty tax, then I favor its retention."

Referring to the clause limiting the duration of contracts, he said: "I do not favor cutting out the 30-day clause so long as I think that we will have government minimum prices eventually, and I do so expect. Perhaps this belief on my part is strengthened by the attempt now being made to get the act back before the Congress."

The U. S. District Court for the District of Columbia held on March 10 that the Commission could not be enjoined from conducting a hearing and making decision upon it. The ruling, handed down by Justice O'Donoghue in a suit brought by the West Kentucky Coal Co., denied the company's plea for a temporary injunction to restrain the Commission from acting on a complaint by the United Mine Workers that the company had interfered with its organizers in violation of provisions of the coal act, in regard to companies selling to the government. The city of Atlanta, Ga., also was unsuccessful in its motion for a new trial of its suit to restrain the Commission from promulgating minimum prices on the ground that the act is unconstitutional (see *Coal Age*, March, p. 64). Counsel for the Georgia city has carried an appeal to the Supreme Court.

Hearing relative to the determination of the weighted average of the total cost of coal produced in Minimum Price Areas 4, 6, 7, 9 and 10, resumed in Denver, Colo., on Feb. 23, was completed the same day. On the following day, the Commission issued an order directing the district boards of Districts 1 to 20 and 22 to proceed to the coordination of prices and rules and regulations in common marketing areas. Representatives of Boards Nos. 8 and 13 were notified to meet for the purpose in Washington on Feb. 27; Boards Nos. 1 to 8 and 9 to 12,

on March 1, and the remaining boards on March 6.

The Interior Department appropriation bill, as reported by the House Appropriation Committee on March 8, carried $2,900,000 for the Coal Commission and $285,000 for the office of Consumers' Counsel. This is a reduction of $600,000 in the Budget estimate for the Commission and a cut of $15,000 for Consumers' Counsel. The Committee's report explained that reduced appropriation was "necessary if expenditures are not to exceed receipts obtained from the 1c. per ton tax levied by the coal act." The report stated further that "the Committee feels that by July 1 next the work of the Commission will have been advanced to a point where some considerable reduction in personnel can be effected without interfering with effective work and at the same time keep the cost of administration within the total receipts."

To Hold Gas Line Hearing

Taking action on various applications and petitions under the Natural Gas Act, the Federal Power Commission, in orders announced on March 4, assumed jurisdiction over the pipe-line system proposed by the Kansas Pipe Line & Gas Co. (*Coal Age*, March, p. 81) and set a public hearing on the project for March 27, and also on the applications of the Public Service Gas Co. and the North Dakota Consumers Gas Co. for certificates of public convenience and necessity for the construction of natural-gas pipe-line systems.

Petitions of the National Bituminous Coal Commission, National Coal Association, American Retail Coal Association, Truax-Traer Coal Co., Northwestern Retail Coal Dealers' Association, Maher Coal Bureau and United Mine Workers to intervene were denied, but each of these petitioners, the Commission's order provided, "may participate in the hearing to the extent of introducing relevant and material evidence, and also may make oral argument and file briefs."

Shawmut Tipple Being Rebuilt

Reconstruction of the tipple of the Shawmut Mining Co. at its No. 5 mine, Ebon, Pa., is under way and will be pushed to completion as promptly as possible. A fire early in February destroyed the structure completed in 1937, entailing a loss of about $70,000.

New Preparation Facilities

CHICAGO, WILMINGTON & FRANKLIN COAL CO., New Orient No. 2 Mine, Orient, Ill.: Contract closed with Jeffrey Mfg. Co. for Jeffrey air-operated jig to treat 200 tons per hour of 0x1½-in. or 367 tons per hour of 6x7/16-in. coal; to be completed late in May.

COSTANZO COAL MINING CO., Wheeling Valley Coal Corporation Warwood (W. Va.) mine: Contract closed with Jeffrey Mfg. Co. for Jeffrey unit washer consisting of diaphragm jig, dewatering screens and clarifying tank to treat 2½x½-in. coal; capacity, 75 tons per hour; to be completed about April 15.

• If I don't do anything else, I will be *sure* to visit the exhibits which show promise of offering me information as to how my company can save money and time. Among these exhibits, I must visit . . .

BOOTH 538

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Union Asks Boost in Appalachian Wages; Operators Propose Reductions

SHORTER HOURS and increased day and tonnage rates were asked by the United Mine Workers in opening Appalachian wage negotiations, March 14, at the Hotel Biltmore, New York City. The operators replied the following day with a counter proposal to retain the present 35-hour week, but reduce wages to the basis prevailing in the 1935-37 agreement. With neither side ready to recede from its publicly announced position at the outset of the conference, usual procedure was followed by referring all questions to a joint committee of 32, with authority to pare this number down to a smaller subcommittee should the joint committee in its executive sessions so elect.

At the time this issue of *Coal Age* went to press, no report had been made by the joint committee to the full conference. Following a suggestion made by John L. Lewis, president, United Mine Workers, at the meeting March 15, the union formally proposed that the conference agree that "in the event no agreement is reached by March 31 (the expiration date of the present Appalachian agreement), work in the industry shall be continued under the existing wages, conditions and contracts pending continuance of negotiations and ultimate success or failure to agree on a new contract."

This motion was rejected by the operator members of the committee on the ground that it was prematurely offered. Appalachian producers, stated the operators' negotiating committee, are opposed to any suspension and will "do everything in their power to effectuate a new contract with the U.M.W. before the expiration of the present agreement. The operators believe that there is ample time to reach an agreement and to make a new contract for a stated period." Both sides, the statement added, are on record as favoring a new contract for a two-year term. Unwillingness of the operators to agree to the Lewis proposal at this time, declared Charles O'Neill, president, United Eastern Coal Sales Co., and spokesman for the producers, did not preclude such an agreement if the necessity for it should arise. He could see no reason, however, why a definite contract could not be concluded prior to April 1.

Union proposals were presented at the opening session of the conference by Philip Murray, international vice-president of the union. These proposals, embodied in a report of the union's international policy committee, were in no sense, declared Mr. Murray, to be regarded as ultimatums. They were, he said, a statement of the desires and hopes of the men at the mines and he solicited their careful consideration by the operators. This same point was reiterated by Mr. Lewis in summing up the union's position in the closing minutes of the March 15 session. The union, he insisted, was ready to discuss each proposal on the basis of logic, facts and equities; if some of these proposals could not meet those tests, they would fall of their own weight.

Union Again Asks 30-Hour Week

In place of the present 7-hour day and 5-day week, the union renewed its plea for the adoption of a 6-hour day and 30-hour week, with provision for 30 minutes overtime at overtime pay for men engaged in the transportation of men and coal, in dumping, handling and preparation of coal and in the manufacture of coke. In addition to the shorter work-day, the union also asked an increase of 50c. per day in rates for all inside and outside men, with proportionate increases for monthly men and a minimum rate of $5 per day for all classes of labor.

Acceptance of the union recommendations also would boost the combined cutting and loading rate 15c. per ton, with 13c. of the increase to the loader and 2c. to the cutter. An increase of 25c. per ton was proposed for pick mining and 20 per cent for yardage and deadwork.

"Rates for conveyor and all other forms of mechanized mining," said the policy committee report, "shall be adjusted in a manner which will enable mine workers employed on mechanized units to earn an amount in wages commensurate with their increased productive efficiency. In all cases the minimums established shall be higher than the earnings of hand loaders. Each district scale committee shall establish as nearly as possible equality in rates for the performance of like work. A standard classification of men employed on the various mechanized units shall be established in order to eliminate varying sizes of crews. The principle employed in adjusting rates at all strip-mining operations shall be the same as that applied to conveyor and other forms of mechanized mining. Where the use of improved machinery entails additional work for the miner, provision shall be

Coming Meetings

• Midwest Power Conference: annual meeting, April 5-7, Palmer House, Chicago.

• American Mining Congress: sixteenth annual coal-mining convention and exposition, April 24-28, Music Hall, Cincinnati, Ohio.

• Second Annual Anthracite Conference: April 28 and 29, Lehigh University, Bethlehem, Pa.

• American Coal Distributors' Association: annual meeting May 25-27, French Lick Springs, Ind.

• Stoker Manufacturers' Association: annual convention, June 1 and 2, French Lick Springs, Ind.

• Mine Inspectors' Institute of America: thirtieth annual convention, June 5-7, William Penn Hotel, Pittsburgh, Pa.

• American Retail Coal Association: annual convention, June 6-8; exposition, June 3-11; Sherman Hotel, Chicago.

• Illinois Mining Institute: 21st annual boat trip and summer meeting, June 9-11, aboard Str. "Golden Eagle," leaving St. Louis June 9 and returning June 11.

made for the payment of extra compensation."

Double time was asked for all work performed on Sundays and holidays. The demands for vacations with pay and for a guaranteed work-year of 200 days, first advanced two years ago, were renewed. Under the revised proposal, day men would receive their regular rates of pay for the vacation period and for each day less than the guaranteed 200; tonnage men would be compensated in both cases at a rate of $6.50 per day. On layoffs and reopenings the union asked that priority rights to jobs be given to employees on the basis of length of service. Where swing crews or systems of staggered employment are used, said the report, "districts shall effect agreements establishing seniority rights designed to discourage the practice of employing new crews, which consequently create unemployment."

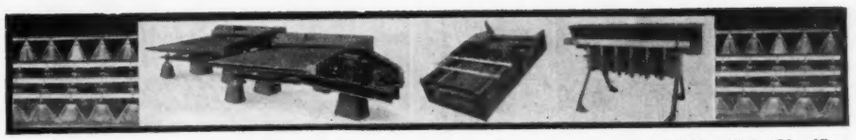
Charging that "tragic inequality, inefficiency and dishonest practices" had crept into "the rendition of medical care and hospitalization in mining communities," the union asked that the mine workers have equal participation with the coal companies in the selection of physicians and that the workers also should participate in the supervision of hospital, medical, surgical and nursing facilities in all cases where such services "are financed through the medium of deductions from mine workers' pay." To discourage discrimination which, it was alleged, is being exercised against mine workers, the policy committee also declared that the entire question of physical examinations should be considered by the joint conference.

Ask Mines Bureau Inspections

"Operators," read another section of the report, "shall permit inspection of their mines by inspectors of the U. S. Bureau of Mines and shall in no way attempt to limit the publication of the reports of inspection." Clarification of the recognition clauses and a standard check-off clause in the new Appalachian and all subordinate district agreements also were requested. "Where coal is to be taken to cleaning or preparation plants," said another section, "the run-of-face loading method shall prevail. All reject clauses shall be eliminated from district agreements."

Demand was made that the work of the joint committee appointed to study the problems of wage rates, conditions of employment and displacement of mine workers be completed and a report made to the joint conference on Dec. 1, 1939. "Adjustments found necessary as a result of these studies shall be made at that time." In presenting this demand, Mr. Murray charged that the operators had been guilty of violating the 1937-39 agreement provisions with respect to the joint mechanized mining commission by refusing to cooperate with union representatives in joint examinations of the mines and in joint studies.

"Foremen or employees who do not come within the jurisdiction of the wage agreement," stated the policy committee report at another point, "shall not perform the duties of maintenance men or other mine workers on idle days or at any other time. An agreed limitation of the number of men of the classification of 'foremen' shall be included in the



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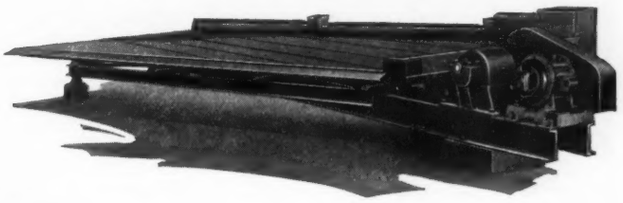

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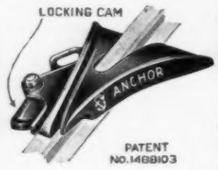

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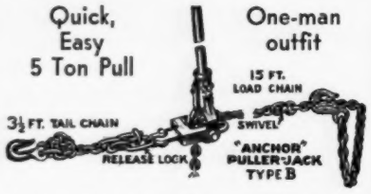

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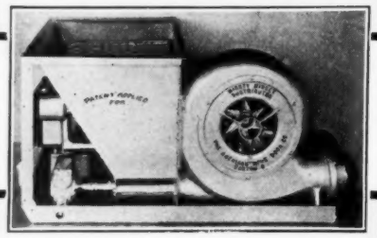

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Appalachian agreement." Other miscellaneous provisions included demand that operators agree to comply with the provisions of the Guffey act, protect wage scales and working conditions where mines are leased for operation to parties not signatory to the agreement, make equitable adjustment of house rents, assume responsibility for delivering cars to and from the working places, make certain that union-made explosives, mine supplies and tools shall be available for use by the workers and effect suitable arrangements for the employment of umpires.

Coal Costs Must Be Lowered

In presenting the reply of the operators to the union proposals, Mr. O'Neill dwelt at length on the present economic condition of the bituminous mining industry. If the industry is to maintain its position, he contended, production costs must be lowered, freight rates reduced, prices rationalized and coal markets enlarged. Unfair competition as exemplified in dump rates on natural gas and hydro-electric power and cheap foreign oil imports also must be eliminated. The seasonal, annual and cyclical fluctuations in production plus the normally inelastic demand, he continued, are fundamentally responsible for the irregularity of employment emphasized by Mr. Murray. If the industry is successful in recovering some of its lost markets, added Mr. O'Neill, this irregularity may be alleviated.

Last year, declared Mr. O'Neill, the estimated consumption of fuel oil, natural gas and hydro-electric power was equivalent to 198,170,000 tons of bituminous coal. Increased efficiency in coal utilization, against which the industry could not rightfully complain, also was taking its toll of tonnage. As a result of this greater efficiency, coal consumption by railroads, public utilities and blast furnaces in 1937 was 104,851,777 tons less than it would have been had 1920 efficiency rates prevailed. Since 1925, the record for the industry as a whole has been one of continuous deficits. The lowest reported in this period was in 1936, when the net loss totaled $6,524,000. In 1927 losses for commercial mines were estimated at $37,000,000 and last year the figure was still higher. Production costs and wage rates have been steadily increasing since the signing of the first Appalachian agreement in 1933.

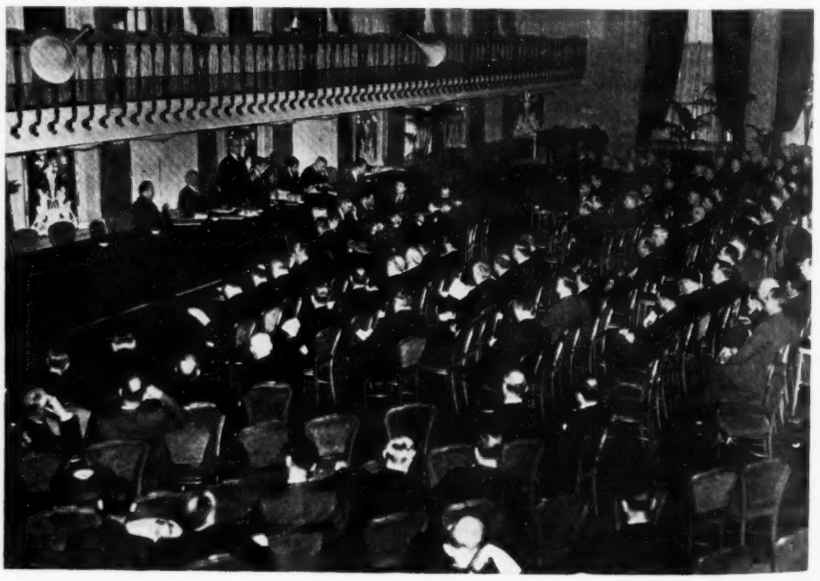
The operators, declared Mr. O'Neill, have not been remiss in efforts to improve the position of the industry. In their efforts to promote the increased use of coal, they have utilized advertising on a national scale within the limits of their financial ability. These national campaigns have been supplemented by individual promotion. Use of domestic stokers also has been pushed by the industry. Time, effort and money have been spent in both pure and commercial research and hundreds of thousands of dollars have been expended in a long-waged fight to reduce the level of freight rates.

"Through many decades," stated a formal statement for the operators, "the industry has progressed from the ancient hand tools, sledge, wedge, pick, shovel and barrows to the use of explosives, to mine cars drawn on tracks by animals and, with the perfection of transmission of compressed air and electricity, to locomotives and mining machines. The only hand tool that has survived to any extent is the shovel and now it is gradually being replaced by loading machinery. Through the years 'effort-saving' devices have been constantly under development and their application is reducing the burden of the miner.

Mechanization Shows Progress

"At the end of 1938 only 3 per cent of the nation's bituminous coal was being mined without explosives or equivalent devices. All except 16 per cent was being cut with machines, and of the underground production approximately 74 per cent was still being loaded in the traditional manner—hand shovels into mine cars. While the Appalachian region has lagged behind other sections of the nation in the adoption of machine loading, within the past four years there has been substantial progress." Wage rates are the highest paid in any industry "for

Opening Session of Appalachian Wage Conference



labor comparable in skill or hazard of employment and the hours of work are the shortest."

Mr. O'Neill took issue with the statement of Mr. Murray that average annual gross earnings of mine workers in the Appalachian area approximated only $960 in 1937; the figure, said Mr. O'Neil, was $1,226. Moreover, in contrast with many of the blue-chip industries cited by Mr. Murray as paying an average of $440 per year more to the workers, coal was the only one which made the machine worker higher than the skilled hand laborer. Few, if any, other basic industries, he continued, have gone to the 7-hour day. To reduce to a 6-hour basis and grant the other union demands would mean an increase of 66c. per ton in the Appalachian region. This was disputed by Mr. Lewis, who said the actual increase would be nearer 27c.

Many of the proposals advocated by Mr. Murray, continued Mr. O'Neill, would be a direct infringement on rights of management heretofore protected in wage contracts. Hospitalization was a local matter and not the proper subject for consideration in an Appalachian agreement. Physical examinations were necessary from sanitation and safety standpoints. Seniority should not be allowed to interfere with efficiency or safety; barring personal prejudices and discrimination because of union activities, management must be protected in its right to decide who should be employed. Proposals to limit the activities of the supervisory employees also was an infringement on the rights of management.

Conflicting Theories Cited

Coal, said Mr. O'Neill, asserts both its right and necessity to mechanize. But he didn't feel that wages should be based on "an amount commensurate with increased productive efficiency." That, he added, was one of the heresies Phil Murray had picked up in his sojournings in strange industrial fields. Of course, added Mr. O'Neill, wages should be as high as can be maintained commensurate with the skill of the man and the hazard of employment. If machinery can make the industry profitable, the wage earners will benefit; if it cannot, the savings effected will go to the consumer.

The public session on March 14 was opened by Duncan C. Kennedy, chairman of the 1937 conference and secretary of the Kanawha Coal Operators' Association. Walter L. Robison, president, Youghiogheny & Ohio Coal Co., was elected chairman of the 1939 conference. Thomas Kennedy, international secretary-treasurer of the union, was made secretary; Charles Dorrance, vice-president, Consolidation Coal Co., assistant secretary; Harry Kennedy, labor commissioner, Kanawha Coal Operators' Association, sergeant at arms, and D. J. McDonald, assistant to Mr. Murray, assistant sergeant at arms.

As forecast in the January issue of *Coal Age* (p. 26) the union forces entered the conference with most of the outlying districts bound by agreements to continue operations at the 1937-39 scale pending the negotiation of the new Appalachian wage agreement. Rocky Mountain districts were among the first to sign such agreements, followed by the Southwest and districts farther east. Utah, Alabama and western Kentucky had

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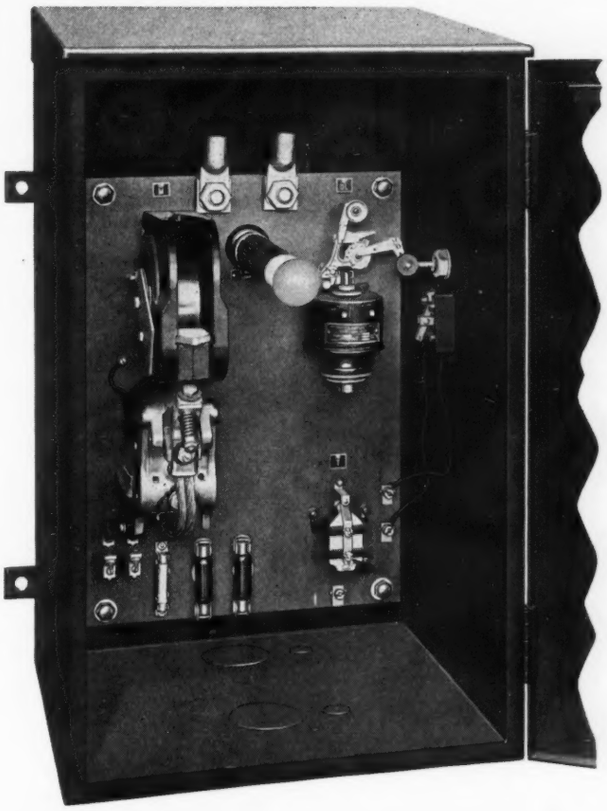

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Permissible Plates Issued

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in February, as follows:

Joy Mfg. Co.: Type 12-BU-5 (Joy Jr. low-pan) loading machine; five 4-hp. motors, 250-500 volts, d.c.; Approvals 364 and 364A; Feb. 9.

Goodman Mfg. Co.: Type 90-L chain conveyor; 5-hp. motor, 230 volts, d.c.; Approval 365; Feb. 28.

not signed up when the conference opened on March 14, but union officials were confident that agreement in those districts would be only a matter of days.

Personal Notes

O. W. BROWN has been named mine foreman at the Hull mine of the DeBardeleben Coal Corporation, Empire, Ala.

T. H. BUTLER, Rock Springs; REX COATES, Kemmerer; JOHN LAYA, Sheridan, have been named by Governor Smith as members of the Wyoming Coal Mining Examiners' Board, effective July 15 next.

JOHN D. COONER, previously safety supervisor for the Hudson Coal Co., Scranton, Pa., has been made assistant superintendent of the company's Olyphant colliery, vice John M. Reid, promoted.

CHARLES DORRANCE, since 1937 vice-president and general manager of operations of the Consolidation Coal Co., has been elected president of the West Virginia Coal & Coke Corporation, succeeding Robert W. Lea, who resigned to become vice-president of the Johns Manville Corporation. Mr. Dorrance became associated with the coal industry with the Lehigh Coal & Navigation Co. in 1907 following his graduation from Lehigh University, becoming its chief engineer in 1910. Three years later he was named manager of the Harwood Coal Co., and in 1915 he entered the service of the Hudson Coal Co. as assistant superintendent. Two years later he was appointed general manager, and then vice-president, from which position he resigned in 1922. For a while thereafter he did engineering work for the Hudson and Glen Alden companies, later becoming president of the Penn Anthracite Mining Co., then president of the Penn Anthracite Collieries Co., its successor.

H. R. ESTILL, formerly connected with the U. S. Coal Commission at Bluefield, W. Va., has been appointed superintendent of mines Nos. 4, 5, 10, 11 and 12 of the Consolidation Coal Co., in the vicinity of Thorpe, W. Va. He was formerly superintendent of the Premier Pocahontas Collieries Co., Premier, W. Va.

M. A. EVANS, formerly assistant superintendent, Sonman Shaft Coal Co., has been appointed chief engineer for the Koppers Coal Co., with headquarters in Pittsburgh, Pa. He succeeds F. S. Follansbee, resigned.

ROBERT B. HEWES, who for the last six years has been affiliated with the Rochester & Pittsburgh Coal Co., has been engaged as assistant supervisor of coal-mining extension at Pennsylvania State College. He will fill the vacancy caused by the resignation of KEITH D. PFOOR. Mr. Hewes is completing work in an extension curriculum in fuel technology, started by Mr. Pfoor, and will head that work when the course has been approved for extension classes.

JAMES LAW has been appointed superintendent at Reliance mine of the Union Pacific Coal Co., Reliance, Wyo., vice M. W. MEDILL, who retired on March 1, after 40 years' service with the company.

FREDERIC LEAKE has been elected president of the board of the Tennessee Products Corporation, Nashville, Tenn. Other officers named are: CARL A. MCFARLIN, president and general manager; LESLIE A. MILLER, vice-president; ALVIN FOSTER, vice-president and treasurer; HAMPTON LACKEY, secretary. The company was reorganized late in 1936, when it acquired the mining properties of the Whitwell Smokeless Fuel Co., Whitwell, Tenn., of which company Mr. McFarlin had been president from its organization (*Coal Age*, January, 1938, p. 108).

C. E. LESHER has resigned as executive vice-president of the Pittsburgh Coal Co., effective April 1, but will continue as president of the Pittsburgh Coal Carbonization Co.

GEORGE W. MCCAA, lately assistant superintendent at the Docena mine of the Tennessee Coal, Iron & Railroad Co., Adamsville, Ala., has joined the sales force of the La-Del Conveyor & Mfg. Co. His headquarters will be at Charleston, W. Va. He was in the engineering department of the Pittsburgh Coal Co. for about three years.

JOHN M. REID, hitherto assistant superintendent at the Olyphant colliery of the Hudson Coal Co., Olyphant, Pa., has been promoted to superintendent, vice E. J. Manning, retired.

J. N. SAMPSON has been appointed State coal mine inspector in Wyoming. Deputy inspectors named are R. E. GILDROY and ROBERT T. REAY.

A. F. H. SCOTT, assistant to the president, Anthracite Industries, Inc., has resigned to become vice-president and general sales manager of the Hoffman Specialty Co., New York City.

J. F. SHORB, heretofore mechanical engineer for the Virginia Iron, Coal & Coke Co., has been appointed chief engineer, with office at Toms Creek, Va., effective March 1.

R. L. STALLINGS, general manager, Georges Creek Coal Co., was elected president of the Georges Creek and Upper Potomac Coal Association at the organization's annual meeting on March 2. He replaces Charles E. H. Brown, president, Masteller Coal Co., who headed the association for the last six years. Other officers named are: vice-president, A. B. CRICHTON, president, Manor Coal Co.; secretary-treasurer, WILLIAM JENKINS, president, Koontz Coal Co.

CHARLES W. STRICKLER, JR., has resigned from the engineering staff of the Lehigh Valley Coal Co., Wilkes-Barre, Pa., to enter the preparation department of the Pittsburgh Coal Co.

LEWIS TROXELL has been advanced to tipple foreman at the Mona mine of the Arkwright Coal Co., Morgantown, W. Va.

L. E. WOODS, president, Crystal Block

Coal Co., Williamson, W. Va., has been reelected president of the Coal Operators' Association of the Williamson Field. Other officers named are: vice-president, C. A. HAMILL, president, Sycamore Coal Co.; treasurer, J. F. McLAUGHLIN; secretary, J. J. ARDIGO.

L. E. YOUNG has tendered his resignation as vice-president of the Pittsburgh Coal Co. as of April 1.

Anthracite Mines Cut Work To Three-Day Week

An emergency three-day work week, instead of the usual five-day week, went into effect as a market stabilizing move in the anthracite mines of Pennsylvania on March 6. The new arrangement was agreed on at a meeting of operators and mine labor leaders with Governor James held at Harrisburg on March 3. Admitting that a crisis had resulted from widespread price cutting following abandonment of the price-filing system on Jan. 8, both sides decided on the move for at least the remainder of March. The plan applies to bootleg operations as well as legitimate producers.

At the same time it was agreed to reestablish the practice of filing prices of all sales with the Anthracite Institute. Should an increased demand for coal arise, it was provided that the curtailed week might be abandoned, in which case a three-man board representing employers, labor and the public would be appointed to modify the production restrictions.

During the conference with Governor James, a long-range recovery plan adopted by the operators at an earlier meeting in New York was submitted to the executive. It calls for the creation of an anthracite commission with the power to regulate the industry through control of prices, production and marketing, and provides for the elimination of bootlegging by law enforcement. Union leaders decided to study the plan before they and operators' representatives conferred with Claude T. Reno, State Attorney General, to see what differences could be adjusted in an effort to obtain united support for anthracite legislation.

Governor James stated that 43 companies, producing 88.3 per cent of the State's anthracite, were represented at the New York meeting. Forty of them, producing more than 70 per cent of the coal, voted for the plan, he added; two were against it and one did not vote.

Group to Study Corrosion

A number of technical societies and other organizations engaged in the study of corrosion have joined in forming the American Coordinating Committee on Corrosion. The new group will serve as a clearing house and coordinating agency for information on experience and work in progress in the field of corrosion and its prevention. The committee was formally organized at a meeting at the headquarters of the American Society for Testing Materials, Philadelphia, Pa., held in February. Among the cooperating organizations and their representatives are: American Institute of Mining and Metal-

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Cincinnati, Ohio

April 24-28

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lurgical Engineers, T. S. Fuller; American Society for Testing Materials, F. F. Farnsworth; Battelle Memorial Institute, H. W. Russell.

As its first step the committee is compiling a list of the names and addresses of those working in the field of corrosion in this country, together with information as to their special interests and their current programs of corrosion studies. To this end the committee is using the facilities of the various cooperating societies, supplemented by the extensive knowledge of its members on corrosion studies in progress throughout industry. Information is being sought respecting the names of individuals and organizations engaged in corrosion studies, the nature of such studies and a record of experience and publications.

The next meeting of the committee will be held in June at Atlantic City, N. J., during the A.S.T.M. annual meeting, at which the information thus far compiled will be reviewed, permanent organization effected, and the work of the committee further considered. Pending permanent organization, C. L. Warwick, secretary-treasurer of the A.S.T.M., is serving as temporary chairman of the committee.

New McGraw-Hill Magazine

"PHOTO TECHNIQUE" is the name of a new monthly magazine to be published by the McGraw-Hill Publishing Co., the first issue appearing in June. It will be the "technical magazine of photography," a field not at present covered by any one magazine in this country. The new publication will not be a picture book. It will be edited for those who desire up-to-date data on the various photographic processes, bringing to the reader the physical and chemical engineering of the art. Keith Henney, author of "Color Photography for the Amateur" and editor of *Electronics* magazine, will be the editor; Beverly Dudley will be managing editor. The subscription price of the new magazine will be $5 per year.

Bill Favors Iowa Operators

A fuel bill designed to give Iowa operators an advantage in the sale of coal to State and local governing bodies was signed late in February by Governor George A. Wilson of Iowa. The law, which was sponsored by the State Senate and House mining committee, permits a purchaser to take into account "the general good of the State, including the employment of labor," in considering coal bids. The new measure will alleviate unemployment in Iowa mines by tempering the requirement that coal contracts be awarded solely on the basis of low price.

Awards Exhibit Contract

Contract for construction of the anthracite exhibit at the New York World's Fair has been awarded by the Anthracite Boosters' World's Fair Committee to Copeland Exhibits, Inc. The Boosters organization has been raising funds through the sale of memberships to the public and labor throughout the five eastern Pennsylvania hard-coal-producing counties (*Coal Age*, February, p. 94). This money is being added to that appropriated by producing companies through Anthracite Industries, Inc.

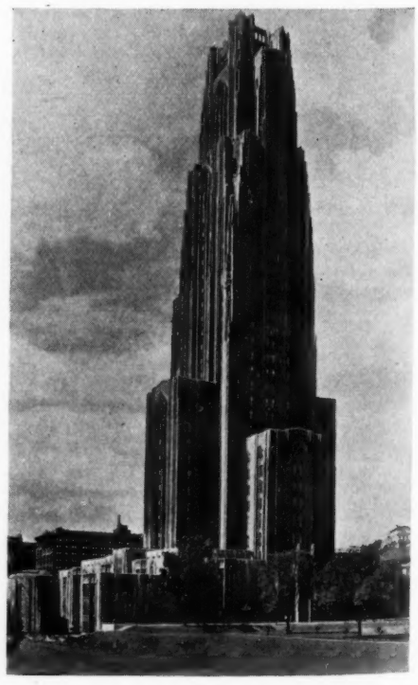
The anthracite exhibit will be the largest in the Home Building Center, adjacent to one of the most important entrances to the fair grounds, and will tell the story of "Anthracite, the Modern Fuel for the Home of Tomorrow," as a clean, convenient and economical heating medium. The display, the first in world's fair history to be sponsored jointly by the public, labor and industry, will show also the many advantages of the hard-coal-producing region as a place in which to live and work. The exhibit was conceived by Gilbert Rohde, industrial engineer and one of the five men selected by the World's Fair Corporation itself to design its focal centers.

Perfect Lawn Developed Despite Smoky Air

Fear that a gradually increasing quantity of sulphur in the smoke-laden air of industrial cities would play havoc with lawn grasses has been dispelled by scientific research workers at the University of Pittsburgh, Pittsburgh, Pa. Under unusually severe conditions they have converted the rock-ledge bank and gravelly bed of a pre-glacial river into six acres of perfectly carpeted campus surrounding the Cathedral of Learning.

Inclusion of the river bed and rock ledge in the campus made terracing necessary. Atop the graded subsoil were posed of one part good top soil, one part of seed bed. The topmost layer is composed of one part good top soil, one part of well-rotted manure and two parts of German peat moss. After elaborate tests it was decided to maintain the soil at a

Smooth greensward provides artistic setting for Cathedral of Learning



fairly acid point, pH 5.6, the original seeding being one-half blue grass, three-tenths bent grass, and one-tenth each of redtop and rye grass. In the battle for survival, the bent grass took a huge lead; blue grass and red top declined; rye grass proved inconsequential.

Maintenance schedule calls or semi-annual fertilization with a mixture of 15 lb. of bone meal and 5 lb. of ammonium sulphate to 1,000 sq.ft. of lawn. If growing conditions show overly acidic areas, no fertilizer is used at those spots; but if grass at other places reveals a trend away from the acidic, the ammonium sulphate is increased. Such notorious pests as dandelions and plantains have found the going in the acid soil at Pitt too rough and have virtually disappeared. The test proves, it is felt, that as coal of higher sulphur content is burned the soil will become more acidic and lead to trouble in lawn raising and maintenance unless recognized and properly handled. as at Pitt.

Heating Men Name New Group On Anthracite Equipment

In further recognition of its responsibility to the solid-fuel industry, the American Society of Heating and Ventilating Engineers has appointed a new subcommittee on anthracite equipment. The new group comprises A. J. Johnson, director, Anthracite Industries Laboratory, Primos, Pa.; J. H. Kerrick, Philadelphia & Reading Coal & Iron Co.; M. A. Young, Dickson & Eddy; and A. A. Norrman, D. L. & W. Coal Co. At the subcommittee's initial meeting, Ralph A. Sherman, supervisor, fuels division, Battelle Memorial Institute, was present in an advisory capacity.

The duties of the new hard-coal group, according to Col. W. A. Daniel, chairman of the society's solid-fuel committee, will include the collection and correlation of information on anthracite and hard-coal-burning equipment, the development and proposal to the society of minimum performance specifications, and detailed cooperation with other research agencies. Consumer satisfaction will be the keynote of its work, but at the same time the interests of manufacturers will be fully protected. In the latter connection working committees are proposed to cover each class of equipment available to anthracite, these groups to act in an advisory capacity and to furnish the last link in a program of society cooperation designed to be of far-reaching importance to everyone concerned with the distribution or utilization of anthracite or its burning equipment.

Obituary

H. W. WALKER, engineer, coal department, Virginian Ry., died Feb. 20 after an illness of several weeks.

J. S. PUGH, 59, foreman at the Dry Branch mine of the Dry Branch Coal Co., Drybranch, W. Va., died March 1 after being struck by a slate fall in the mine.

MRS. WILLIAM H. TAYLOR, 77, who took over the operation of the St. Clair Coal Co., St. Clair, Pa., anthracite producer, when her husband died in 1928, died

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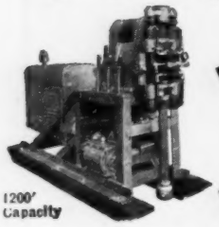

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March 7 in Phoenix, Ariz., after a month's illness resulting from a fall. She was active in the management of the company until she left in January on a trip to the West.

C. G. Dickinson, 47, for twenty years superintendent for the Fort Branch Coal Corporation, Fort Branch, W. Va., died March 18 in a Richmond (Va.) hospital. He had been in ill health for several months.

Charles E. Ash, 65, vice-president and secretary of the Glen Alden Coal Co., died March 8 at his home in Kingston, Pa., of a heart ailment. He entered the employ of the Lehigh & Wilkes-Barre Coal Co. as a breaker boy at the age of nine; was named auditor of the Honey Brook division in 1901; became paymaster of the Wyoming division in 1912, and in 1921 was elected secretary and treasurer of the company. When the Lehigh & Wilkes-Barre was merged with Glen Alden he continued as an executive.

John Crosby Brydon, 65, long a notable figure in both the bituminous and anthracite branches of the coal industry, died March 7 at his home in Chicago, after a year of failing health following a slight stroke. His most recent coal connection had been as vice-president in charge of operations of the Pittston Co., 1928-31. Previous to that he had been president of the Quemahoning Creek Coal Co., which he organized, and also was head of the National Coal Association.

William J. Feeney, 62, international organizer of the United Mine Workers, died March 9 of pneumonia at Charleroi, Pa. He had formerly been president of District 4, U.M.W., an appointee of President John L. Lewis.

Coal Fellowships Offered

Four fellowships for research in coal and non-metallics are offered by the College of Mines of the University of Washington, Seattle, Wash., in cooperation with the U. S. Bureau of Mines. The fellowships are open to graduates of universities and technical colleges who are qualified to undertake investigations. Ordinarily the appointees register as graduate students and become candidates for the degree of Master of Science in Engineering or Metallurgical or Ceramic Engineering; occasionally an appointee registers for the Bachelor of Science degree.

The purpose of these fellowships is to undertake the solution of various problems being studied by the Bureau of Mines that are of especial interest to the State of Washington, the Pacific Northwest and Alaska. The investigations consist principally of laboratory work directed largely by the Bureau's technologists. The work is performed in the Mines Laboratory, a large modern building fully equipped with the newest types of machinery and apparatus. Problems in the utilization of coal and coke and combustion of coal on underfeed stokers are among the subjects selected for investigation for 1939-40. Fellows enter upon their duties on July 1 and continue for twelve months. Applications, which will be passed upon late in April, should be addressed to Milnor Roberts, dean.

Sales of Mechanical Stokers Exceed Year Ago

Sales of mechanical stokers in the United States during January last totaled 3,587, according to statistics furnished the U. S. Bureau of the Census by 112 manufacturers (Class 1, 56; Class 2, 33; Class 3, 36; Class 4, 32; Class 5, 12). This compares with sales of 4,971 units in the preceding month and 2,423 in January, 1938. Sales by classes in January last were: residential (under 61 lb. of coal per hour), 2,921 (bituminous, 2,435; anthracite, 486); small apartment-house and small commercial heating jobs (61 to 100 lb. per hour), 267; apartment house and general small commercial heating jobs (101 to 300 lb. per hour), 210; large commercial and small high-pressure steam plants (301 to 1,200 lb. per hour.), 144; high-pressure industrial steam plants (more than 1,200 lb. per hour), 45.

New Process Briquets Easy to Handle

A new process for making marketable coal briquets from slack coal lying in mine dumps—for which a patent has been applied—has been formulated by G. E. Luce, Brazil, Ind. After lengthy experimentation, according to the inventor, he has perfected a method for eliminating such objectionable features as the sticky and dirty quality caused by the tar preparation usually used as a binder, as well as the unpleasant odor arising when they are burned in a stove or fireplace.

Elimination of the unsatisfactory features, says Mr. Luce, has been brought about by the discovery of a new binder made from fireclay. In the new process, the clay is reduced to a milk form and the fine coal is saturated with it and then placed in a hydraulic press, where it is compressed into cylindrical form under a pressure of 2,000 lb. After being taken from the press the briquets are given an oil bath and then a heat-treatment to caseharden them. They can then be handled without soiling the hands, according to the inventor.

Industrial Notes

Lincoln Electric Co., Cleveland, Ohio, has opened a factory branch at 1914 Utah Ave., Seattle, Wash. J. B. McCormick, who formerly represented the company in Fresno, Calif., and recently in Spokane, Wash., will be in charge.

Mine Safety Appliances Co., Pittsburgh, Pa., has created the new office of chairman of the board, to which George H. Deike has been elected. Other officers named are: J. T. Ryan, president and general manager; J. F. Beggy, vice-president and secretary; George H. Deike, treasurer; J. T. Ryan, Jr., assistant general manager.

Manning, Maxwell & Moore, Inc.,

Bridgeport, Conn., manufacturer of valves, gages and precision instruments, has appointed C. H. Butterfield as vice-president and general sales manager, vice W. P. Bardbury, deceased. Ralph F. Heath has been made sales representative at Houston, Texas, and Jack Schuyler at New Orleans, La.

UNION WIRE ROPE CORPORATION, Kansas City, Mo., has named C. A. Schacklette as sales representative in southern Illinois, southern Indiana and western Kentucky, with headquarters at Owensboro, Ky.

TEMPLETON, KENLY & CO., Chicago, manufacturer of jacks, has appointed W. H. Kreer as sales engineer. He formerly represented the company in the Middle West for many years.

—⟡—

Size Limit on St. Louis Coal May Cause Mine Boycott

A public hearing on a proposed amendment to the St. Louis (Mo.) smoke ordinance which would restrict the size of coal sold in the city was held at the city hall on March 13 by members of the Public Safety Committee of the Board of Aldermen. The bill, introduced by Committee Chairman Hubert Hoeflinger at the request of Smoke Commissioner Raymond R. Tucker, would make it unlawful to sell coal which would not pass through a 6-in. circular opening. If passed by the board, the measure will become effective July 1. Its provisions do not apply to coal containing less than 20 per cent volatile matter.

In order further to reduce smoke in the city, the measure provides that after a plant generating heat or power has been installed in the city a certificate must be obtained from the Smoke Commissioner warranting consistent operation of the plant "by an ordinary person" without creating dense smoke. It also forbids issuance of permits for the installation of any fuel device of the surface-burning type in sizes larger than those capable of supplying steam at the rate of 600 sq.ft. of direct radiation in multiple dwellings designed to house three or more families.

While the existing ordinance provides for washing of coal up to 2 in. and hand-picking of all sizes above that, it does not limit the size of individual lumps. The Smoke Commissioner said the amendment was proposed because many producers were shipping large lumps of coal into the city, and his office could not determine the quantity of impurities they contain.

Convinced that the amendment would be adopted, Clarence G. Stiehl, president, St. Clair-Madison Coal Operators, said he would organize a trade boycott against St. Louis jobbers and manufacturers in protest against it.

—⟡—

Handy Fire Starter

"Kindle-Pac," a new product introduced by Anthracite Industries, Inc., is designed to do away with the necessity for scouting around the cellar for newspapers and kindling wood with which to start a fire in a furnace or pot stove. It is a 14-oz. bag of specially treated paper and charcoal which ignites at the touch

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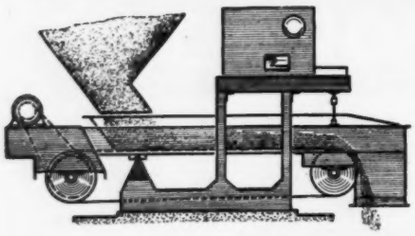

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Centennial of Vulcanization Observed by Goodyear

Celebrating the 100th anniversary of the discovery of vulcanization by Charles Goodyear in 1839 and the 40th anniversary of their company, representatives of the mechanical goods division of the Goodyear Tire & Rubber Co. were guests at the Akron (Ohio) factories Feb. 20-23 to participate in a combined homecoming and centennial celebration. Highlights of the observance, attended by 2,000 Goodyear sales representatives from all parts of the world, were: unveiling and dedication of a statue of Charles Goodyear in front of the Akron City Hall; a "world's exposition" of rubber products and historical materials in Goodyear Hall, and a civic dinner sponsored by the Akron Chamber of Commerce.

Growth of the rubber industry since Goodyear's discovery is illustrated by the latest available figures on employment and consumption of raw materials in manufacturing tires, transmission and conveyor belting, rubber floor and wall covering, printers' supplies, soles and heels, mattresses and seat cushions, boots and shoes, electrical equipment, waterproof transparent wrapping materials, myriad sundries and novelty items. Worldwide employment in the growing, collecting, processing and distribution of finished rubber goods totals more than 4,000,000; cotton consumed in the manufacture of rubber products totaled 375,000,000 lb. in 1936; numerous other raw materials required in rubber manufacturing, having an estimated value of $57,000,000, were produced in 35 States. Retail value of rubber products sold in the United States in 1937 was $1,248,000,000, or about 50 per cent of the world's total. Investment in the rubber business is estimated at $2,698,000,000.

Blaze Damages Power House

Two brick buildings which housed power equipment of the St. Ellen mine of the Perry Coal Co., near O'Fallon, Ill., were destroyed on Feb. 27 by fire resulting from a short circuit. The loss was estimated at more than $50,000. The mine, which employs more than 250 men, would be shut down about three weeks, according to an announcement by D. W. Green, superintendent.

Extend Power to New Mine

A new power line is being built by the West Penn Power Co., at a cost of about $20,000, from Lanks Hill to Coal Bluff, where a new substation is to be constructed to furnish power for the Yough-

ioghenу & Ohio Coal Co.'s new mine at Wallace Station, Pa. When completed, the mine will be capable of producing more than 1,200 tons per shift. The tipple, which is now under construction, will be equipped with shaker screens, picking tables and loading boom. Other outside development also is under way, and the company expects to be shipping coal about the middle of this year.

Natural Gas Act Amendment Has N.C.A. Support

An amendment to the Natural Gas Act was introduced in the House of Repre-setnatives at Washington on March 15 by Representative Dirksen (R.) of Illinois. The measure is designed to remove certain restrictions on the power of the Federal Power Commission, which has control over the natural-gas industry, and to permit producers and distributors of coal to become parties at interest in all proceedings affecting extension of gas lines. The amendment also would authorize approval of schedules of rates and empower the Commission to stop the dumping of industrial natural gas even in cases where it necessitated raising the rate for such gas, which action is now specifically prohibited under the law.

The coal industry is squarely behind this measure, says the National Coal Association, and will keep close watch on its progress toward enactment. Indications are that it will be some time before the measure actually comes up for consideration, and in the meantime N.C.A. advises all operators to lay plans to let their representatives in the Senate and House know how they feel about the bill. In order to make such communication most effective, the association will keep producers informed as to the probable consideration time and the best time to send such communications.

Favor Use of Black Powder In Non-Gassy Mines

The West Virginia Legislature has gone on record as favoring the use of black powder in blasting coal in mines not having explosive gases or coal dust in dangerous quantities. The Senate, without a dissenting vote, approved a resolution to that effect early in March, following its earlier indorsement by the House.

Representative Bishoff, of Preston, sponsor of the resolution, said that permissible explosives, because of high velocity, shattered coal in his district to such an extent that some of it was not in marketable sizes. Under State Department of Mines regulations, he said, black powder had been banned in his district. He added, however, that the department was in agreement with the intent of his resolution.

Bombers to Go to High Court

A rehearing in the case of 34 Illinois Progressive Miners convicted of a conspiracy to obstruct the mails by bombing railroads (*Coal Age*, January, 1938, p. 104, and February, 1939, p. 94) was denied by the U. S. Circuit Court of Appeals at Chicago on Feb. 24. Defense

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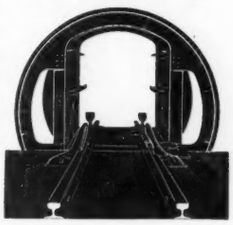
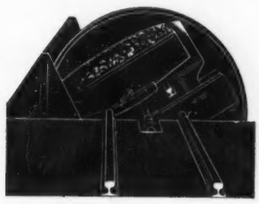


GRAVITY CAR DUMPERS



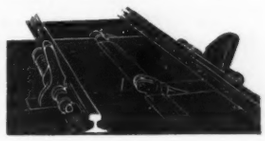
Low in first cost and effect important savings because of gravity operation and one-man control. Speed:—5 to 7 cars per minute. For uncoupled dumping.

CHAIN TRIP FEEDERS

For feeding trips to dumps and cages — elevating loaded cars to tipple — and making up empty trips. Available for push-button or automatic control — or continuous operation.

CUSHIONED CAR STOPS

Inexpensive units for protecting knuckles slopes, rope hauls, partings, shaft stations, etc. Semi-automatic models may be used instead of full automatic cagers for small tonnages.



AUTOMATIC CAGERS

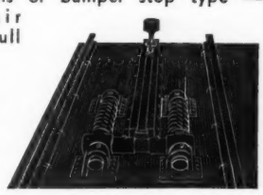
Unquestionably the safest and most practical units ever developed for the caging operation. Save time, labor, cars and coal. Cushioned horn or bumper stop models.

MINE CAR RETARDERS

Eliminate necessity of spragging and hand braking of mine car trips fed to cagers and dumpers. Control trips on steep grades — without damage to car wheels.

Automatic Dump Feeders

Cross-over, rotary and cradle dump types. Cushioned horns or bumper stop type — spring or air cushioned. Full automatic operation, semi-automatic or manual. Ends spragging or use of brakes.



The Mining Safety Device Co.
Bowerston, Ohio

We will be glad to receive information on the following equipment: _____

_____

_____

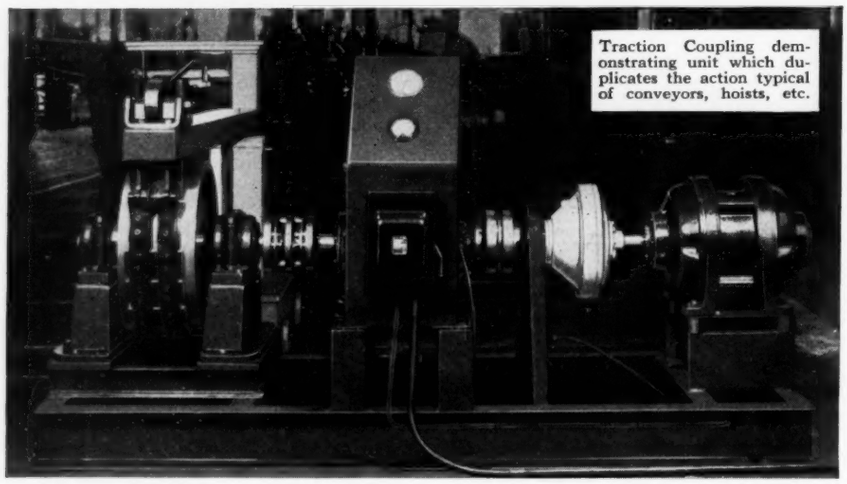
_____

Name _____

_____

THE MINING SAFETY DEVICE CO.
BOWERSTON, OHIO

at the 16th Annual Coal Convention and Exposition


Traction Coupling demonstrating unit which duplicates the action typical of conveyors, hoists, etc.

Impeller and Runner

Mining men and their friends are invited to see the Fluid Drive (traction type Hydraulic Coupling) in action at Cincinnati, April 24-28. This new Fluid Drive has no mechanical connection between driving and driven halves, and offers many advantages. Power is transmitted by the kinetic energy of the fluid (usually light turbine oil) which circulates automatically by centrifugal action between the radial passages formed by vanes in the rotating members. Transmission of shocks from the driving motor to the load or from the driven machine to the motor are entirely eliminated. Sudden stalling when overload occurs is taken entirely by the Fluid Drive without damaging the motor. See the exhibit. Bring your problems. Ask questions.

USES:
for Conveyors, Crushers, Shaker Screens, Pumps, Hoists, Locomotives, Excavating Equipment, etc.

HYDRAULIC COUPLING DIVISION
AMERICAN BLOWER CORP., 6000 Russell St., Detroit, Mich.
Division of American Radiator and Standard Sanitary Corp. In Canada: Canadian Sirocco Co., Ltd.

counsel said they would carry the case to the U. S. Supreme Court, asking for a writ of certiorari for a review of the proceedings. In appealing, the defense attacked the government's procedure in trying all the defendants together and in presenting mass evidence.

A.S.T.M. Studies Dustiness and Ignitibility

The Subcommittee on Dustiness of Committee D-5 on Coal and Coke, American Society for Testing Materials, reported during the second week in March that it had reached agreement on the standardization of a testing procedure for determining the relative dustiness of either coal or coke. By this means it will be possible to evaluate the effectiveness of various treatments available for eliminating the formation of dust.

Another important project involves the development of a standard method for determining ignitibility of coal and coke. Following a recent meeting of the subgroup responsible, agreement was reached on a statement of definition of this property as follows: "The ignitibility of fuel is that characteristic which determines the ease with which the fuel may be brought to a condition of self-supporting, active oxidation. The ignitibility is governed not only by the inherent chemical characteristics of the fuel that determine its rate of oxidation at various temperatures but also by the physical characteristics of the fuel and its surrounding that determine the rate at which it can be heated. Among these physical characteristics are: (1) the size of the pieces of fuel; (2) specific heat of the fuel; (3) thermal conductivity of the pieces and the aggregate; (4) rate at which the oxygen or air is brought into contact with the fuel; (5) rate of heat loss to the surroundings. Chemical and physical changes, such as melting and decomposition of bituminous coal, may occur as the fuel is heated."

It was announced that the group concerned with plasticity and swelling of coals for coke making had distributed a series of different coals to various cooperating laboratories to be tested by different methods under consideration. The first series of such tests have been completed and the data are being compiled and studied.

A. C. Fieldner, chief, Technologic Branch, U. S. Bureau of Mines, is chairman of Committee D-5.

Trade Literature

BLOW-OFF VALVES—Yarnall-Waring Co., Philadelphia, Pa. Bulletin B-420 gives description and operating principles of Yarway units for low- and medium-pressure boilers, with directions for selecting units for different pressures. Bulletin B-430 gives similar information on units for high-pressure boilers.

CABLE COVERING—Anaconda Wire & Cable Co., New York City. Folder cites the advantages of Sunex Securityflex, a sun-, heat-, moisture-, alkali- and acid-resisting jacket to protect mining cables under the most severe conditions.

CAR PULLERS AND HOISTS—Stephens-Adamson Mfg. Co., Aurora, Ill. Catalog

7738 gives specifications, dimensions and required engineering information on how to select the proper car puller.

CLEANING MATERIALS—Oakite Products, Inc., New York City. A special issue of "Oakite News Service," marking the company's 30th anniversary, gives an interesting historical review of the development of specialized cleaning methods and materials, and how they have contributed in helping American industry speed production and keep manufacturing costs low.

COMPRESSORS—Sullivan Machinery Co., Michigan City, Ind. Bulletin A-18 describes the line of air and gas compressors known as Class WN-112, illustrating a variety of industrial installations and showing feature construction details clearly and simply.

CONTROL INSTRUMENTS—Foxboro Co., Foxboro, Mass. Bulletin No. 225, on temperature controllers, discusses factors governing selection and outlines the types of air-operated units with which to meet particular industrial needs. Bulletin No. 229 sets forth the functions and advantages of Foxboro gages where pressure is an important factor; standard specifications are given. Bulletin 214-1 describes the two generally used types of air-operated controlled valves—the quick-opening type for open and shut control and the Stabilflo type for throttling control. Bulletin 202-2 explains the function of Potentiometer Controllers in governing temperatures in industrial processes.

DIAMOND CORE DRILLS—Mott Machine & Mfg. Co., Huntington, W. Va. Bulletin No. 6 cites features of the unit with standard large-size core for bituminous coal.

DRYER—Link-Belt Co., Chicago. Booklet No. 1711 (16 pp.) is devoted to the Roto-Louvre unit for economical drying of coal and other materials.

ELECTRICAL CABLES—Hazard Insulated Wire Works, division Okonite Co., Wilkes-Barre, Pa. Catalog 179 (48 pp.) illustrates and describes various types of electrical cables for mining use, including portable or trailing cables, portable cords, miners' lamp cord, electric shovel cable for stripping operations, borehole and shaft power cable, and power cable for inside transmission. Useful tables are included.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued the following bulletins: GEA-594B, Automatic Control Panels for Industrial Electric Heating; GEA-2641A, Sealed Axle Bearings (grease-lubricated) for mine-locomotive and industrial-locomotive motors; GEA-2872, "What Every Plant Operator Should Know About Metal-Inclosed Switchgear"; GEA-2879, Mine-Locomotive Gearing; GEA-2964, Full-Voltage Magnetic Starter; GEA-2989, "How to Make Cable Joints—Portable Cable."

ELECTRICAL EQUIPMENT—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has issued the following bulletins: B-2131, Combination Linestarter; B-2159, Geared Drives; B-2165, Induction Feeder Voltage Regulators; B-2164, "Simple Facts About Synchronous Motors"; B-2175, "Steam-Drive Power at Less Cost"; Descriptive Data 3610, Gearmotors; Descriptive Data 3530, Industrial Motors; De-

For Those Operators Interested in Economy

KING POWDER

Offers a Complete Line of Explosives for the Coal Mining Industry!

No matter what your conditions are—kind of coal; mining methods; depth of seam; size desired; loading equipment, etc.,—KING makes an explosive to fit your needs *exactly*. Each type was developed in our laboratories, then thoroughly tested and *proved* in the strip pits and underground mines of your industry. Wherever they have been used, they have boosted production, improved working conditions, increased safety for men and equipment.

Remember . . . when you specify KING, you get an efficient explosive that can be handled quickly, with a minimum of waste and danger!

•

WRITE TODAY

Our demonstrators will gladly *prove* the *quality* and *efficiency* of our products in your operation.

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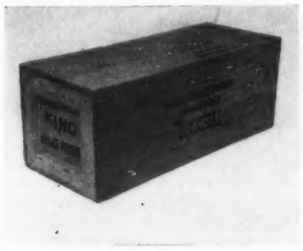
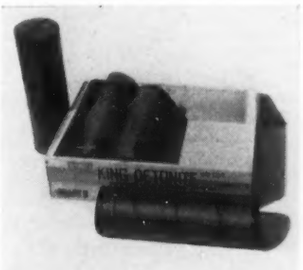


KING PELLET POWDER

Made in various speeds, densities, and cartridge sizes to properly shoot any vein of coal.

KING PERMISSIBLES

The King Permissible series includes powders made in speeds from 4900 ft/sec. to 11,400 ft/sec. and in stick counts from 118 to 252 sticks of 1¼ x 8 inches per 50 lb. case.



KING DETONITE

The new explosive especially designed to shoot overburden economically. May be used in either horizontal or vertical holes.

THE KING POWDER COMPANY
INCORPORATED
CINCINNATI, OHIO

scriptive Data 3620, Speed Reducers; Catalog Section 47-225, Feeder-Voltage Boosters; Catalog Section 47-230, Feeder-Voltage Booster Regulators; Catalog Section 74-000, "Trolley Line Material and Rail Bonds" (90-pp. catalog); Descriptive Data 15-100, Heavy-Duty Master Switches; Descriptive Data 29-080, Air Circuit Breakers; Instruction Leaflet 1734-B, Grid-Type Resistors; Instruction Leaflet 2806, Electrical Interlock for Alternating Current.

EXPANSION JOINT—Foster Wheeler Corporation, New York City. Bulletin X-39-5 describes and pictures construction details of the Type "S" unit, designed to meet present-day conditions.

FLEXIBLE PIPE-LINE CONVEYOR—Johns Conveyor Division, Osborn Mfg. Co., Cleveland, Ohio. Form No. J tells what the Johns conveyor system for transporting granular materials and liquids is, what it does, how it works and how it acts; typical installations are pictured.

MINE JACKS—Buda Co., Harvey, Ill. Bulletin 948 lists, with specifications, a variety of jacks for use in tracklaying and maintenance, roof supports, post pulling and straightening, lifting mine cars and locomotives, and other mine jobs.

MINING EQUIPMENT — Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin 161 (96 pp.), entitled "Equipment for Metallic, Non-Metallic and Associated Industries," reports latest developments in all types of machinery applying to processes in such industries and includes information on blowers and compressors, dryers, electrical power, pumping, transmission and related equipment. Bulletin 1195 (8 pp.) describes "Lo-Maintenance" squirrel-cage induction motors, giving case studies of units that have been in operation under adverse conditions. Leaflet 2203-B, on compact self-contained gearmotor speed reducers for efficient low-speed operation, presents numerous line drawings and installation illustrations showing typical applications.

PIPE-REPAIR CLAMPS—M. B. Skinner Co., South Bend, Ind. Catalog No. 38A (32 pp.) describes a variety of equipment for permanent pipe repairs, including: emergency pipe clamp, pipe saddle, pipe-line clamp, pipe-joint clamp, collar-leak clamp, bell-joint clamp, split coupling clamp, high-pressure weld clamp, band clamp, pressed-steel economy clamp, service saddle, saddle tee, heavy-duty service saddle, pipe bender, boss hickey, valve and bibb reseater, combined reseating tool, utility reseater and bibb seat dresser.

PORTABLE ELECTRIC TOOLS—Black & Decker Mfg. Co., Towson, Md. Catalog for 1939 (56 pp.) displays the company's complete line, including a new 3/16-in. drill, 5/16-in. ball-bearing utility drill and a new No. 36 portable electric hammer, as well as other new tools introduced during the last year.

SAFETY GARMENTS—Holcomb Safety Garment Co., Chicago. Catalog No. 103 (32 pp.) lists, with illustrations, a variety of safety apparel, including gloves, leggings, spats, knee and hand pads, sleeves, aprons, hats, helmets, and one- and two-piece suits.

SAFETY SHOES—Lehigh Safety Shoe Co., Allentown, Pa. Booklet contains data and illustrations of 41 steel-toe safety work shoes designed to provide maximum wear and safety under every type of floor condition in all lines of industry.

STOKERS—Westinghouse Electric & Mfg. Co., Philadelphia, Pa. Booklet B-2710 (20 pp.) describes bituminous-coal burning units for use in industry, including multiple-retort stokers for boilers from 300 rated bhp. up and single-retort units for boilers from 100 to 500 bhp.; typical applications are pictured.

TIME CONTROL—Electric Controller & Mfg. Co., Cleveland, Ohio. Leaflet tells about Neo-Time acceleration for motors, providing a simple timing method that is flexible and permits selection of practically any range from a few seconds to several minutes per step.

Coal-Mine Fatality Rate Declines Further

Accidents at coal mines in the United States caused the deaths of 59 bituminous and 27 anthracite miners in January last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 35,530,000 tons, the death rate among bituminous miners was 1.66 per million tons, compared with 2.91 in the corresponding month of last year.

The anthracite fatality rate in January last was 5.44, based on an output of 4,959,000 tons, as against 5.40 in the first month of the preceding year.

For the two industries combined, the death rate in January last was 2.12, compared with 3.24 in January, 1938.

Fatalities during January last, by causes and States, as well as comparable rates for the first month of 1938 and 1939, are shown in the tables in the adjoining columns.

UNITED STATES COAL MINE FATALITIES IN JANUARY, 1939, BY CAUSES AND STATES

	Underground										Open-cut and Surface				
	Falls of roof	Falls of face	Haulage	Gas or dust explosions	Explosives	Electricity	Machinery	Other causes	Total underground	Persons falling down shafts	Mine cars	Falls of Persons	Other causes	Total surface	Grand total
Alabama	2	..	..	..	..	1	1	..	4	..	..	..	..	..	4
Colorado	1	1	2	..	..	..	..	..	4	..	..	..	..	..	4
Illinois	2	2	..	..	..	1	..	..	5	..	..	..	2	2	7
Indiana	1	..	..	..	..	1	..	..	2	..	..	..	..	..	2
Iowa	1	..	..	..	..	..	..	..	1	..	..	..	..	..	1
Kentucky	5	..	2	..	..	2	..	..	9	..	..	..	..	..	9
Ohio	4	..	1	..	..	..	..	..	5	..	..	..	..	..	5
Pennsylvania (bit.)	4	..	2	2	..	..	2	1	11	..	..	..	..	..	11
Tennessee	..	..	1	..	..	..	..	..	1	..	..	..	..	..	1
Virginia	1	..	1	..	..	..	..	..	2	..	..	..	..	..	2
West Virginia	6	1	1	..	1	1	1	..	11	..	1	..	1	2	13
Total (bituminous)	27	4	10	2	1	6	4	1	55	..	1	..	3	4	59
Pennsylvania (anthracite)	12	3	2	..	5	..	..	1	23	1	1	2	..	3	27
Grand Total	39	7	12	2	6	6	4	2	78	1	2	2	3	7	86

FATALITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES*

January, 1938 and 1939

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939
Falls of roof and coal	48	31	1.551	.873	17	15	3.531	3.025	65	46	1.817	1.136
Haulage	15	10	.484	.281	2	2	.415	.403	17	12	.475	.297
Gas or dust explosions:												
Local	4	2	.129	.056	...	...	.....	.....	4	2	.112	.049
Major	10	...	.323	.....	...	...	.....	.....	10	...	.280	.....
Explosives	2	1	.065	.028	1	5	.208	1.008	3	6	.084	.148
Electricity	3	6	.097	.169	...	...	.....	.....	3	6	.084	.148
Machinery	2	4	.065	.113	...	...	.....	.....	2	4	.056	.099
Shaft	1	...	.032	.....	...	1	.....	.202	1	1	.028	.025
Miscellaneous	2	1	.065	.028	...	1	.....	.202	2	2	.056	.049
Stripping or open-cut	...	1	.....	.028	5	...	1.038	.....	5	1	.140	.025
Surface	3	3	.097	.085	1	3	.208	.605	4	6	.112	.148
Total	90	59	2.908	1.661	26	27	5.400	5.445	116	86	3.244	2.124

*All figures subject to revision.

Mine Labor Disputes Settled By National Board

Orders issued by the National Labor Relations Board late in February settled labor disputes affecting twenty coal companies in Kentucky. An order on Feb. 25 was against the Operators' Association, an employer organization composed of nineteen companies, with headquarters at Madisonville, Ky. and four of its member operators—Williams Coal Co., Mannington; Reinecke Coal Mining Co., Grapevine Coal Co. and Sixth Vein Coal Corporation, Madisonville. The proceeding arose upon charges of unfair labor practices made against the association and the four member operators by the United Mine Workers, District 23.

The Operators' Association is directed to cease interfering with the exercise by employees of any of its members of their right of free choice of bargaining representatives; supporting the Independent Miners Union of Western Kentucky, District 1, or any of its locals; giving effect to contracts between I.M.U., the association and the four companies; and entering into or renewing hereafter any contracts with I.M.U. relating to employees of any member. The order further requires that the association and the four companies withdraw all recogni-

tion from I.M.U. and to disestablish it as a collective bargaining agency.

An order was issued by the Board on Feb. 20 based on a stipulation requiring the Stearns Coal & Lumber Co., Stearns, Ky., to cease discouraging membership in the United Mine Workers, District 19. The company agreed and the Board ordered it to pay $14,750 in remedial wages to 67 men, the aggregate sum to be apportioned among them by the NLRB Regional Director of the Ninth Region. Reinstatement was offered to 23 of these men. The company was to post notices of compliance and to notify the Regional Director within 30 days of the steps taken.

Receiver for Brewerton Mine

Lawrence H. Hoff, attorney, was appointed receiver of the Jefferson mine, of the Brewerton Co., Springfield, Ill., on March 11 by Circuit Judge L. E. Stone. This action was taken on a motion filed by counsel for the Reconstruction Finance Corporation, which charged that the company had defaulted in payments on mortgages held by RFC securing loans to the company. The receiver took charge of the property pending disposition of foreclosure proceedings. The mine was closed on Feb. 3 and W. A. Brewerton, president of the company, resigned.

Workers Become Mine Owners

The Virden Coal Co., Virden, Ill., gave place on March 2 to the Virden Mining Corporation as 122 miners, each owning one share of stock, took over management as well as operation of the organization's mine on a cooperative basis. The men are members of the Progressive Mine Workers. L. P. Bradley was elected as president of the new corporation, with Otto Burkett as secretary and treasurer.

LETTERS
To The Editor

Roof Control

Mr. Buggey's letter in the March issue of *Coal Age* (p. 78) is of peculiar interest to me as I have presented the general procedure for solving this problem in the following articles: (1) "Roof Control Problems in Entries and Headings in Flat Lying Seams," *Coal Age*, October, 1938; (2) "Roof Support for Openings in Pitching Coal Seams," *Coal Age*, January, 1939, and (3) in an article published in this issue.

This type of problem lends itself very readily to solution by scientific study and barodynamic tests. They should be undertaken on the property referred to by Mr. Buggey. The cost therefor will appear negligible when balanced against the increased safety and profits resulting therefrom.

PHILIP B. BUCKY,
Associate Professor of Mining,
Columbia University

Anthracite Recovery

In the Scranton *Tribune* of Jan. 4 you are quoted as stating that "it begins to look as if the united advertising front formed by hard-coal producers three years ago in Anthracite Industries, Inc., is beginning to be effective in checking the rate of loss." In view of the condition of the hard-coal industry, I cannot see what basis in fact you have for any such statements. You are like the *Wall Street Journal—usually away off* in your opinions regarding hard coal.

It isn't advertising that is needed, accompanied by high-pressure methods of selling. "Beginning to be effective in checking the rate of loss." What rot! How do you get this way? How can you use such words when your own publication cites a 6,000,000-ton loss in 1938? How can you say "checking the rate of loss" when this "rate of loss" is not only *not being checked* but, on the contrary, the loss is increasing with an ever greater and greater accelerating rate? Strange indeed, exceedingly strange, that *supposedly* reliable journals should make statements *absolutely at variance with the actual facts.* Possibly "advertising" has something to do with the matter after all. This is no reflection, of course.

I know the solution for anthracite's troubles. And the solution doesn't lie in silk-shirt automatic equipment such as stokers either. It isn't in "advertising" unless this advertising *assures the consumer an uninterrupted supply of pure coal at a price the consumer is willing to pay in competition with all other fuels.* This indeed would be advertising worth while.

Wall Street has done its share to put anthracite where it is today just in the same manner as Wall Street has done a thousand times more to "queer" itself in the eyes of our people than the politicians have. Wall Street finance did more than anything to bring about the 1929 depression and Wall Street has done little since to lessen or mitigate the depression which is still with us with unabated force. If a dictatorship should come or should fascism come or other forms of drastic governmental control come, so-called *high finance* will be largely to blame. While anything I say in this letter must not be construed as criticizing any person personally, I do mean to criticize what some people *stand for* in the severest possible terms. *This means you* and some others I could name.

In September, 1933, I visited New York, New Jersey, New England and Canada to find out *what the trouble was and is with anthracite.* I found out. I went, I inquired, I saw and I came back convinced that the root of anthracite's troubles lay with the consumer. It was the "consumer be damned or ignored," instead of the consumer be served. Tell me—what business can long exist which damns and ignores those who buy its goods? Up to the great crash of 1929 and for a number of years after the *anthracite industry* did just that—and is still doing this in so far as any guarantee of *supply* or a *fair price* is concerned. *No wonder that production continues to sag year after year.* I made the prediction in 1934 that unless *my formula* was put into practice forthwith anthracite production would stabilize between 25,000,000 and 30,000,000 tons annually.

My formula is this: "Anthracite recovery is possible only by positively and convincingly assuring the consumer of an *uninterrupted supply* of *pure coal* at a *price* the consumer will pay in competition with all other fuels."

In order to put this formula into effective operation, operators and United Mine Workers must get together and forever guarantee that strikes, suspensions and lockouts will never again occur. That this can be done is fully proved by plenty of precedent. And, moreover, this must be done. There is no alternative for anthracite recovery.

For many years I was connected with a labor union in an official capacity. Back in 1891 a conference of the International Molders' Union and the employers members of the Manufacturers' Protective and Development Association adopted the principle of arbitration for the *settlement of all disputes* and provided for a conference committee, six iron molders appointed by the union and six members appointed by the employers' association, all to hold office from Jan. 1 to Dec. 31 of each year.

The resolutions further provided that:

Whenever there is a dispute between a member of the M.P. and D.A. and the molders in his employ (when a majority of the latter are members of the I.M.U.) and it cannot be settled amicably between them, it shall be referred to the presidents of the two associations before named, who shall themselves or by delegates give it due consideration. If they cannot decide it satisfactorily to themselves, they may, by mutual agreement, summon the Conference Committee, to whom the dispute shall be referred and *whose decision by a majority vote shall be final and binding upon each party for the term of twelve months.*

Pending adjudication by the presidents and conference committee, *neither party to the dispute shall discontinue operations, but shall proceed with business in the ordinary manner.*

I came into the Molders' Union in 1904 when but a youngster. This agreement before molders and manufacturers worked like a charm. Never a strike, never a lockout, never a suspension. But the "machinery" molders wouldn't do as we (the stove and furnace) molders did. The result is that the "machinery" molders were cut completely to pieces by strikes, suspensions and lockouts.

If such an agreement had been in practical working operation between anthracite operators and United Mine Workers for the past 20 years or more, *anthracite*

would, today, still be the king of fuels with not less than an 80,000,000 *annual tonnage and not less than* 160,000 *men employed.* This is as sure as that two and two make four. There is still a chance that anthracite can recover its lost ground, but it will take time and, above all, it will have to adopt the formula I have devised, and further—the anthracite industry will have to adopt an agreement similar in form and precise in principle to the agreement of 1891 between the International Molders' Union and the Manufacturers' Protective and Development Association.

WILLIAM LAFONTAINE,
Scranton, Pa.

Should Coal Favor Oil?

I was very much interested in the article entitled "Coal Mine Presidents Say," particularly from the standpoint of the wide range of answers. The general concern seems to be with the lost tonnage and the low production of 1938, but right from p. 1 of this issue I have cut out the following announcement of an interesting story to be printed in the March issue of *Coal Age* and, is in my estimation, the best advertisement for the coal industry's competitors:

With an average daily output of 485 tons the Fort Hartford Coal Co. has a connected electrical load totaling 155½ hp. This entire load is handled by a diesel-powered 60-kw. d.c. generator. Power unit and auxiliaries cost $5,745; fuel oil cost is 0.6c. per kilowatt-hour. How Fort Hartford conducts its operations to make these results possible will be told in March *Coal Age.*

If it is cheaper for a coal mine to use diesel-power plants for making its electric current, then how can the coal industry expect their prospective customers to believe in the economy of coal when the producer of coal apparently thinks and is willing to boost otherwise? This is only one instance of many similar cases.

There has been considerable concern about the increased number of installations of fuel-oil and gas burners in homes and the resultant loss of domestic coal to these fuels. A check of the employees and those interested in the success of the coal industry will no doubt show that a goodly number of these oil and gas burners are in their basements and even many of the presidents of coal companies do not burn their own product. Each individual no doubt thinks that his burning of fuel oil or gas is insignificant to the consumption of coal, but, just as one termite will not do a great deal of damage, a whole nest of them will sooner or later destroy a building. How can we expect our neighbor to be interested in buying a coal stoker when we ourselves are burning oil or gas? This practice is the best testimony that a fuel-oil- or gas-burner salesman needs. We had best get our own basements in order and then it will be easier to convince the other fellow that coal is the better fuel.

Not many coal companies are interested in what happens to their coal after it leaves their sidetracks at the mines. The sale of domestic coal is often entrusted to the care of indifferent fuel retailers who sell both coal and oil and placed at the mercy of aggressive oil salesmen. If the coal industry had taken as much interest in the sale of coal stokers as have the stoker manufacturers, there would no doubt be more coal stokers and fewer oil burners.

The coal operators have found it expensive to shovel coal at the face but costly trucks are still being held up as much as an hour while the coal is shoveled in it at the retailer's yard. Does a spread up to $3.50 to the casual retailer for handling the coal from the railroad car to the cellar help the sale of coal in the face of heavy competition from fuel oil?

Tonnage seems to be the key-word instead of profits at the mines. In order to be a tonnage getter and a big operator, coal is sold at prices that are ridiculously low. If anyone can be accused of dumping on the market at give-away prices it is the coal industry. There is too much of the buyers being encouraged by the coal salesmen to write their own prices. Until coal salesmen learn to sell service as well as coal and get a reasonable price for their product the present condition will continue to exist. A salesman who can sell 100,000 tons at a profit is more of an asset than one who sells 300,000 tons at a loss, but too often the glory goes to the big-tonnage salesman. The majority of coal buyers feel sorry for the coal industry and would be willing to pay a reasonable price, but what can they do when they have these low prices forced on them?

The various operators' associations and the National Coal Association are doing a good job, but with the selfishness of some of the operators who think only of their immediate problem it is hard to hold them in line as a unit and get them to do what is best for all.

Government interference or regulation of the coal industry is not the answer. The Guffey bill has turned out to be a mirage and should be repealed and the expense of maintaining the department stopped. It would be much more beneficial if this money were spent on research to develop new uses for coal than trying to accomplish the impossible task of setting prices for coal. The individual coal operators know what their prices should be and foolish sales practices cannot be legislated out any more than the prohibition amendment destroyed the drunkard's will to drink. There will be just as many ways to bootleg low coal prices as there were ways of bootlegging liquor.

Fair-trade sales laws that would require each individual coal mine to sell its product at a profit may be the solution. It would be a lot easier to occasionally check the profit and loss statement of each mine than the selling price of each car of coal and the tactics behind the sales. This would be more flexible and would not kill the initiative to create more economy in mining and would not hold the umbrella over the inefficient or uneconomical operation. It would also allow some leeway in the prices of the various sizes and permit taking advantage of good sales tactics. It would have a tendency to eliminate the unprofitable mines, and instead of the coal industry being a liability it would become an asset to the coal-producing States.

The excessive taxing of fuel oil to protect the coal industry is not the answer and in a short time would be a boomerang with more damaging effects. With a little aggression by the coal industry it can meet this competition. Each should carry its fair share of taxes, but to tax lamb to protect beef is not sound.

Decreasing the costs at the mines and turning it over to the railroads in increased freight rates doesn't help the sale of coal. If the southern coal-carrying railroads can transport coal long distances for reasonable rates and make money, then the cost per mile on the other railroads should be set on the same basis and not be made to absorb losses of transporting other products. Coal seems to be a dumping ground for increased freight rates.

Mechanization of the coal mines will have many beneficial results and should help to stabilize the industry. Instead of having the major costs fixed there will be more opportunities for efficient management to reduce costs. The well-managed mines with favorable mining conditions will have the advantage of cost and, indirectly, the selling prices and will put the coal production in the hands of responsible organizations who have been in bankruptcy so many times that they know the ins-and-outs of the bankruptcy laws better than the lawyers.

With mechanization will come a better and more intelligent class of men who will be steady workers and not mid-week workers and week-end drunks. This should help to put coal mining on a higher esteem in the minds of the public. Prosperity cannot come to any industry using methods a century old and paying out for labor several times that necessary when it can be done equally as well by machines.

Flexibility in wages is not the answer and also excessive earnings for the work performed in comparison with other industries will work a hardship on both the company and the man. There was plenty of flexibility in the wage scale in the recent depression, and I believe that it is generally agreed that uniform wages are best for the biggest majority and beneficial to the coal industry as a whole. The trouble has been that selling prices are more flexible than wages and there is no bottom to either.

Advertising that is to play on the sympathy of the public and trying to justify the coal industry's existence will not get the desired results. The coal consumer is interested solely in how well his heating or fuel problem is taken care of and not in how many coal miners are idle or how many locomotives are white-leaded because he isn't burning coal. We may think he should be interested—but is he?

In conclusion the coal industry's need for increased tonnage can be helped by finding and developing new ways for using coal and not through artificial means. This can partly come from new uses for its byproducts, but the major recovery must come from regaining lost energy-consuming outlets that can be found by intensive research, of which the industry is at present devoid. The coal must be delivered to the consumer at the lowest possible price consistent with efficiently operated mine costs and with less transportation expense, based on what it actually costs to move coal and not on what it takes to make up the railroad's financial deficiency. The Bituminous Coal Act should be repealed, for price fixing is not practical at present with the wide range of costs and types of coals.

W. WALLACE DARTNELL,
Claremont, N. H.

WHAT'S NEW

In Coal-Mining Equipment

CONVEYOR BELT; AIR HOSE

An improved conveyor-belt construction, embodying a feature designed to enable the belt to withstand unusually severe service, is announced by the Mechanical Rubber Goods Division of the United States Rubber Co., New York City. This refinement, it is stated, is accomplished by embedding a specially woven breaker-strip fabric in a heavy layer of soft white gum, which is inserted next to the belt carcass as an integral part of the belt cover, thus providing a shock-absorbing cushion for the cover. The effectiveness of the cover in resisting gouging, snagging and other severe treatment thereby is increased, along with its ability to cushion heavy blows.

To meet increasingly severe service demands, the company also offers the new U. S. "Super Royal Cord" air hose, including a high-grade synthetic-rubber tube, a tan-gum cover and an exclusive method of bonding the cover and tube to the hose body for maximum adhesion. The hose is recommended by the company for mining work and hot-oil conditions.

CAP TESTER

Described as proof against moisture and water under even the extreme conditions sometimes found in large tunnels and shafts, a new galvanometer for testing electric blasting caps is offered by the Atlas Powder Co., Wilmington, Del. In addition, the new galvanometer, it is asserted, is easier to use, has a higher factor of safety, and is made with a separate cell compartment and a lighter non-corrosive case.

WELDING HOSE

Announcement of the receipt of patents on its "Twinweld" welding hose, covering both a multiple-passage hose and a method of manufacture, has been made by the Hewitt Rubber Corporation, Buffalo, N. Y. The new hose is described as consisting of two lines of unusually flexible cord-reinforced welding hose formed by a 22-ft. multiple-cavity mold into a single unit at a temperature of 290 deg. F. According to the company, the hose will not kink, does not require taping and will not writhe nor twist under high pressure. Any pressure differential in one line has no effect on the companion line, it is stated. "Twinweld" hose is available in any desired length up to 500 ft. The acetylene line is colored red and the oxygen bright green.

TRACK SKIDS

To minimize mine-haulage accidents, Portable Lamp & Equipment Co., Pittsburgh, Pa., offers two new devices for spotting cars and controlling

trips on long, steep grades. The holding skid, it is stated, is made of the highest-grade malleable iron and fits all standard mine rails. It is said to be particularly valuable for spotting empty and loaded cars at the face. The running skid consists of a shoe and half soles of special alloy metal in rights and lefts which can be replaced inexpensively. One size fits all standard mine rails.

CLUTCH-BRAKE

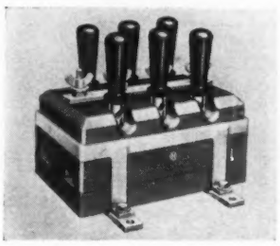
A new magnetic clutch-brake combination said to have the unique quality of providing a positive clutch, friction clutch and friction brake is announced by the Stearns Magnetic Mfg. Co., Milwaukee, Wis. Bearing the designation "FFP," the new unit, it is stated, can be engaged at normal motor speed and is the only type of magnetic-friction device which gives smooth acceleration, positive non-creep running and split-second disk-brake stopping. The new combination is said to lend itself to simple remote control. It is declared by the company to be particularly adapted to service as a safety device on positive drives.

GOGGLES

Hinged-frame goggles that fit over prescription glasses and swing up out of the way without removing the headband and without disturbing the regular glasses are offered by the Sellstrom Mfg. Co., Chicago. Designed for the welder who must wear glasses, the goggles are made to fit over all types of glasses snugly enough to eliminate chance light.

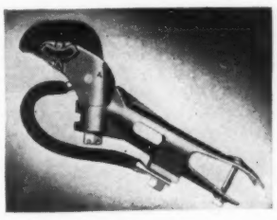
JUNCTION BOX: COLLECTOR

Ohio Brass Co., Mansfield, Ohio, announces a new cable-connection device designated as the O-B Type A multiple-junction box. Stated to be simple in design and operation, this junction box facilitates the connection of one to three circuits with the power off. It is specially designed for handling trailing-cable connections from cutting, drilling and loading machines at the face. The body of the box is of impregnated wood. Feeder-cable inlet and outlet are at one end, and cable ends are accommodated by adjustable clamps within the body of the box.



A combination galvanized malleable-iron clamping band and mounting arrangement locks the two sections of the box together after connection of the feeder cable. Trailing cables from machines are inserted into rubber-handled phosphor-bronze plugs and are locked tightly into position by a turn of the rubber handle. When connection is desired, the plug body, split for a tight wedge fit, is inserted into its proper hole in the junction box, which is designed for 250 to 600 volts, d.c.

A new current collector for heavy-duty trolley service is another O-B product. Designated as the Type F mine shoe



and harp, the collector provides a special alloy-steel shoe, or glider, and a one-piece malleable-iron harp casting. The shoe is designed for heavy currents and offers over 3 in. of wire contact surface. An extra-size shunt completes the assembly.

BUTTON FITTING

A new free-flow giant "Alemite" button-head fitting, designed to speed up the lubrication of heavy machinery equipped with bearings requir-

ADVERTISING PAGES REMOVED

ing large quantities of lubricant (such as tractor-track rolls, etc.), is announced by the Stewart-Warner Corporation, Chicago. Less time is required with the new fitting and there is less chance of damage to grease-gun equipment through overloading, the manufacturer states. The improved valve is said to open easily under slight pressure and to provide an effective seal against the loss of lubricant when the pressure is released.

JACKS

Templeton, Kenly & Co., Chicago, offer an improved model of their No. 310 15-ton emergency jack, designated as No. 310A. The improvements include: 1 in. more lift to a total of 14 in.: 37 per cent easier lifting: triple-tooth lifting and retaining pawls; greater overload capacity; base area increased to 10 sq.in.; rack-

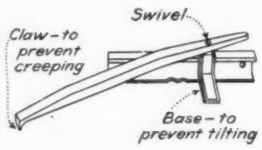
bar toe-lift area increased to over 2 sq.in.; ability to raise and lower the load the full limit of the rack bar when working at an angle; base-locking hook that can be engaged and disengaged by the operator's foot; more convenient carrying handles; and a greater rack-bar-gib slide bearing. The new jack is fitted with a 5-ft. steel chain, a forged-steel auxiliary shoe and a 5-ft. heat-treated lever bar.

A new line of malleable-base screw jacks also is announced by the company. Malleable-iron bases, the manufacturers

point out, are tougher and less subject to breakage from dropping or rough handling. The jacks also are lighter in weight and a peephole enables the operator to see how far the screw has been run out. Friction, it is stated, has been reduced 88 per cent by means of a floating cap resting on a chrome-molybdenum ball. This cap has a 9-deg. float, said to completely center the load. Principal sizes in the Simplex screw-jack line now are furnished with malleable bases.

RERAILER

Gibraltar Equipment & Mfg. Co., St. Louis, Mo., announces the new "Gemco Tru-Blu" rerailer, which it describes as a light, flexible unit for mine service. It is fabricated of



"Gemloy" high-strength tool steel and is available in two sizes: one, weighing 13 lb., for 20- to 40-lb. rail, and the other, weighing 17 lb., for 40- to 60-lb. rail.

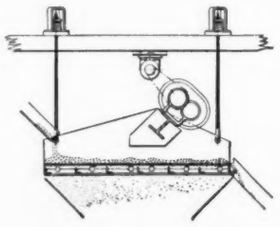
TRACTOR SHOVEL

Maine Steel, Inc., South Portland, Me., offers the Sargent "overhead shovel," which it describes as an attachment for a standard tractor for use in moving earth or similar material or for loading coal or snow. In operation, the shovel is dropped down in front of the tractor and is loaded by moving the tractor forward. The shovel then is swung up over the tractor to the unloading position at the opposite end, as shown in the accompanying illustration. The smallest shovel for handling earth is $\frac{3}{8}$ cu.yd. Larger sizes are available for light materials and larger tractors. A bulldozer blade with down-pressure can be hooked onto the shovel in 15 minutes, the company states, and the unit can be changed to a snow loader in 30 minutes.

In loading coal, a 40-hp. tractor is employed along with a 2-cu.yd. bucket, which can be filled about two-thirds full to make it a practical one-ton unit. The bucket has a trip cover and from two to four buckets can be loaded per minute into cars or trucks up to $10\frac{1}{2}$ ft. high. At present, the equipment is being manufactured for use with "Cletrac" tractors only, but eventually it will be made available for all standard crawler tractors.

BLINDPROOF SCREEN

A new type of low-head screen designed especially to help keep the fine mesh cloth clean has been added by the Allis-Chalmers Mfg. Co., Milwaukee, Wis., to its line of vibrating screens. Known as the Sta-Kleen screen, it is said to be unusually well adapted to the screening of moist materials such as fine crushed



stone, ore, and particularly coal, that usually cause blinding.

Several inches below the screen cloth this new design incorporates a sub-deck made of perforated metal with relatively large holes. The space between this additional deck and the screen cloth is divided into compartments each containing a special rubber ball. When the screen is in motion the rapid bouncing of these balls within their respective spaces sets up a secondary vibration in the screen cloth. Blinding is thus reduced to a minimum and without appreciable wear on the cloth.

EYESHIELD

Willson Products, Inc., Reading, Pa., offers the Willson "Protecto-Shield" eyeshield for light grinding, woodworking, spot welding and similar occupations. Made of transparent cellulose acetate in several colors, the shield extends well back along the sides of the face and is large enough to fit over

correction spectacles. It is easily thrown back when not in use. The adjustable molded-rubber headband and all other parts are easily replaceable, it is stated.

WHITE PRINTS

Ozalid Corporation, New York City, announces a new line of automatic printer-developers for making white prints. The Model A machine handles papers up to 42 in. in width and has a speed of up to 20 f.p.m. Automatic separation of the original and print is a feature of this machine. The Model D office-type machine is said to be so simple that even an office boy can operate it. The Model E unit combines "an entirely new Ozalid printer with an advanced type of Ozalid developer in a single, compact, light-weight unit." It handles papers up to 42 in. in length. Printing speed ranges up to 30 in. and developing speed up to 32 in. per minute.